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(54) Title of the invention: Lubrication and self-cleaning system for expansion mandrel

(51) Int Cl⁷: E21B 7/20 33/14 43/10

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(56) Documents Cited:	
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US 5181571 A	US 4402372 A
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As for published application 2356651 A viz: UK CL (Edition S) B3J, E1F FJT FLA INT CL ⁷ B21D, E21B Other: Online: WPI, EPODOC, JAPIO updated as appropriate	

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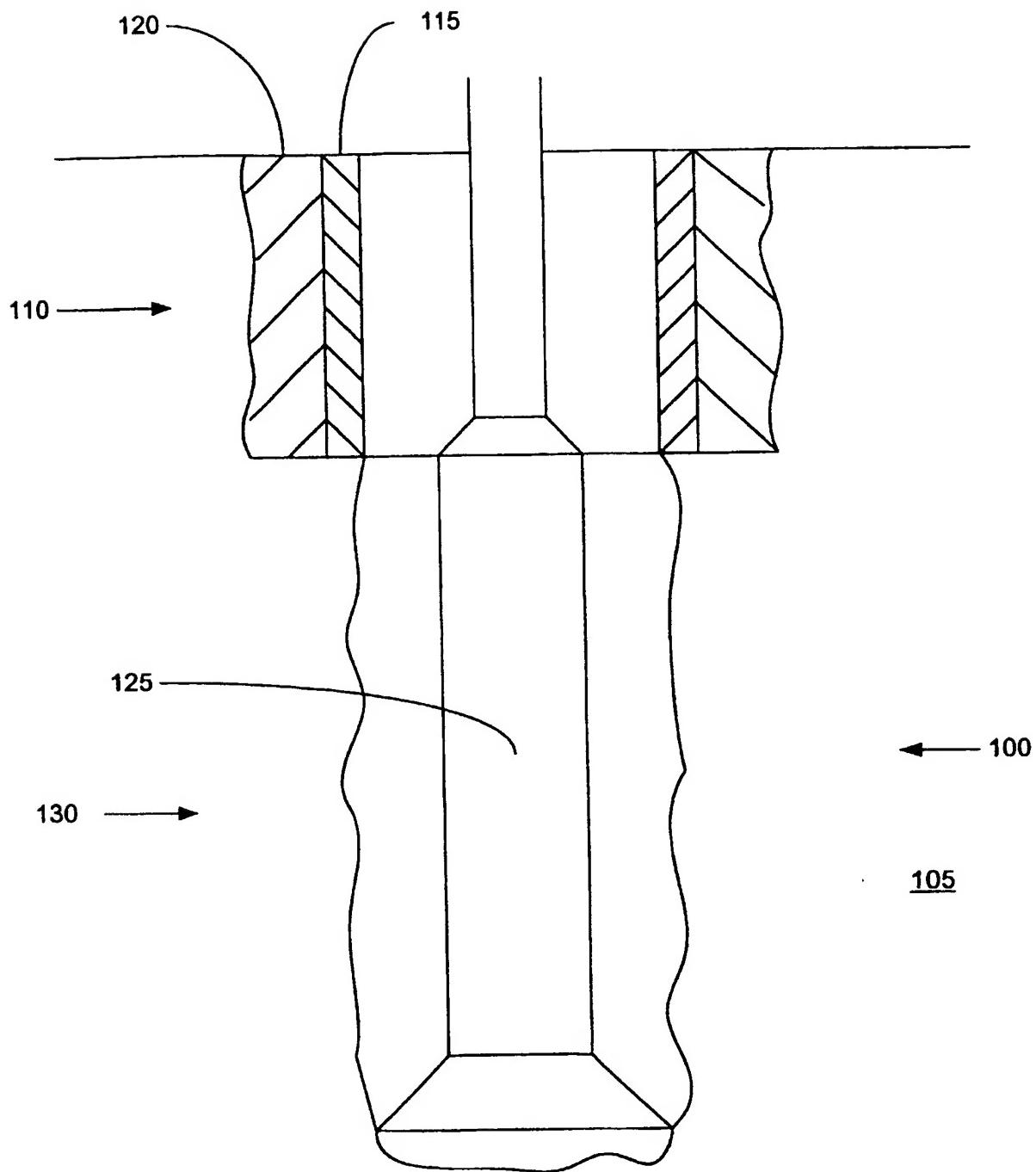


FIGURE 1

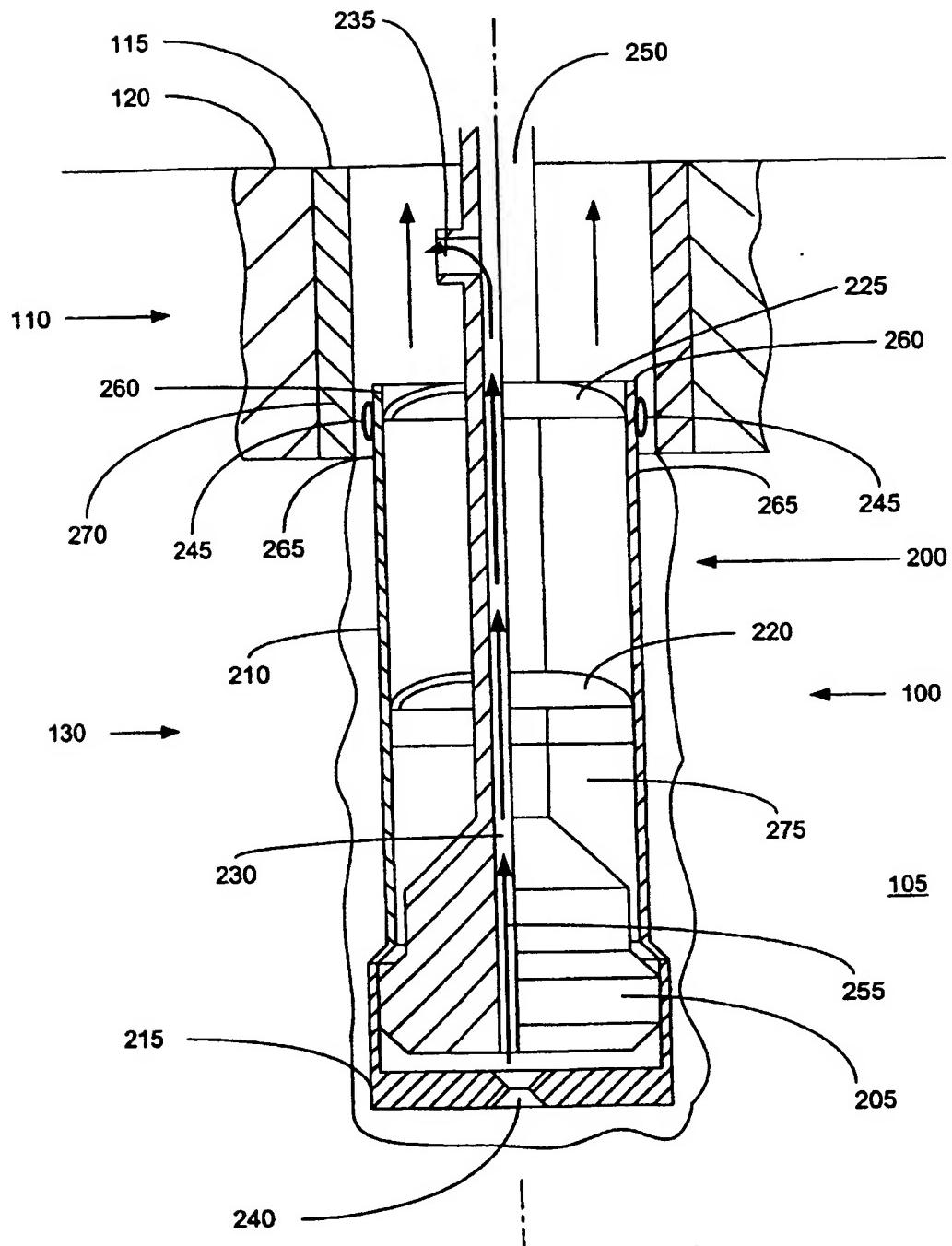


FIGURE 2

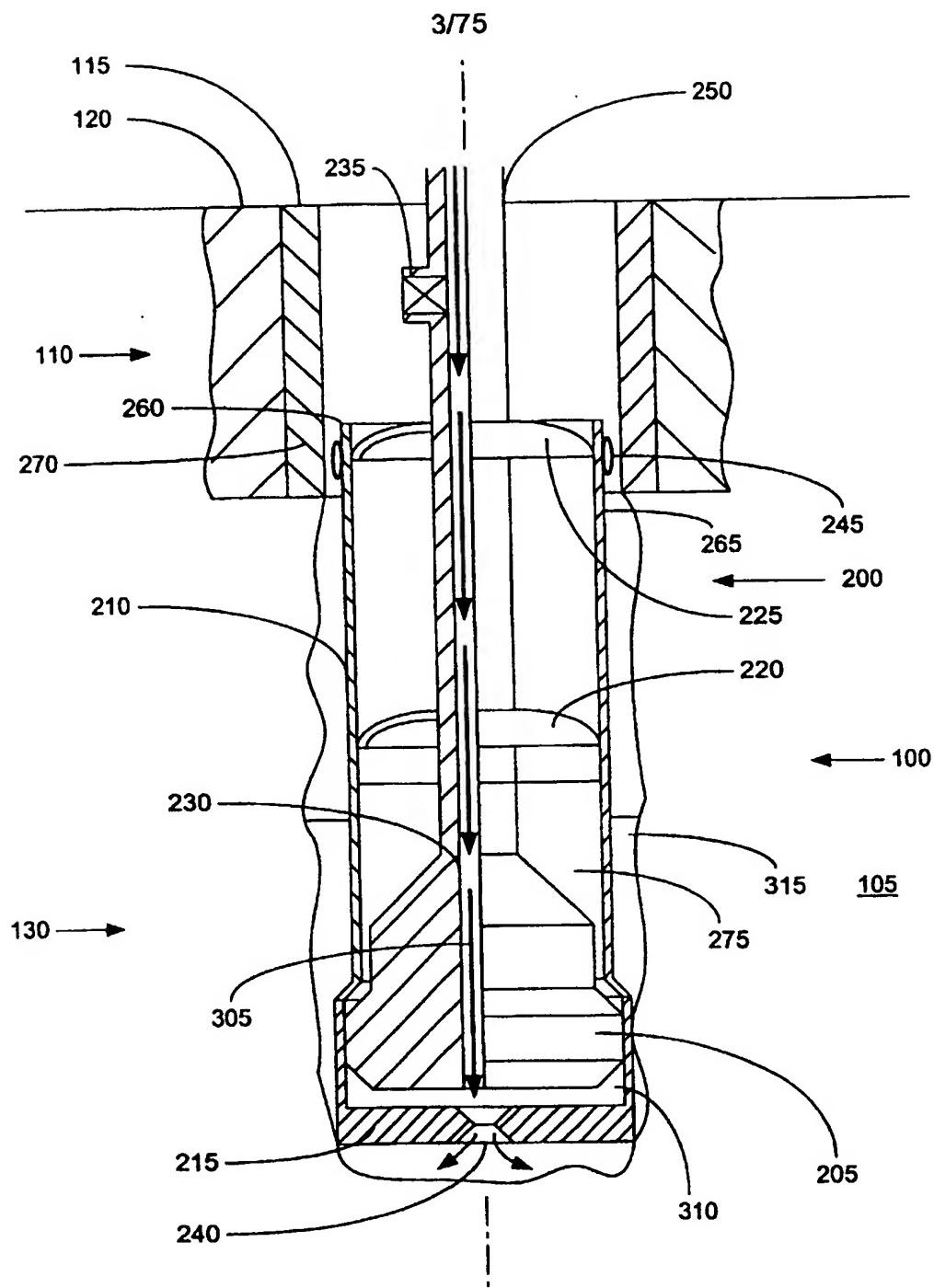
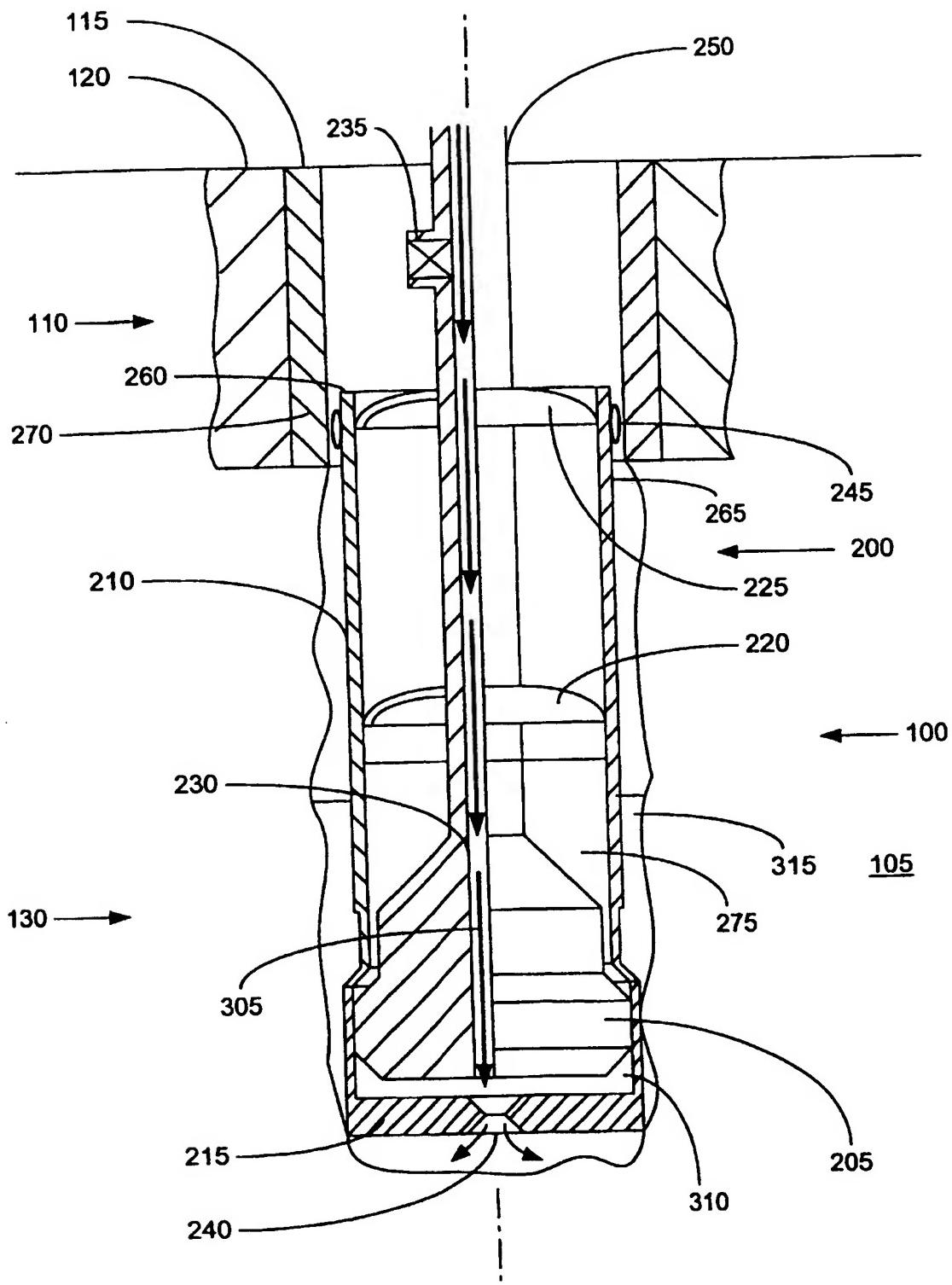


FIGURE 3

**FIGURE 3a**

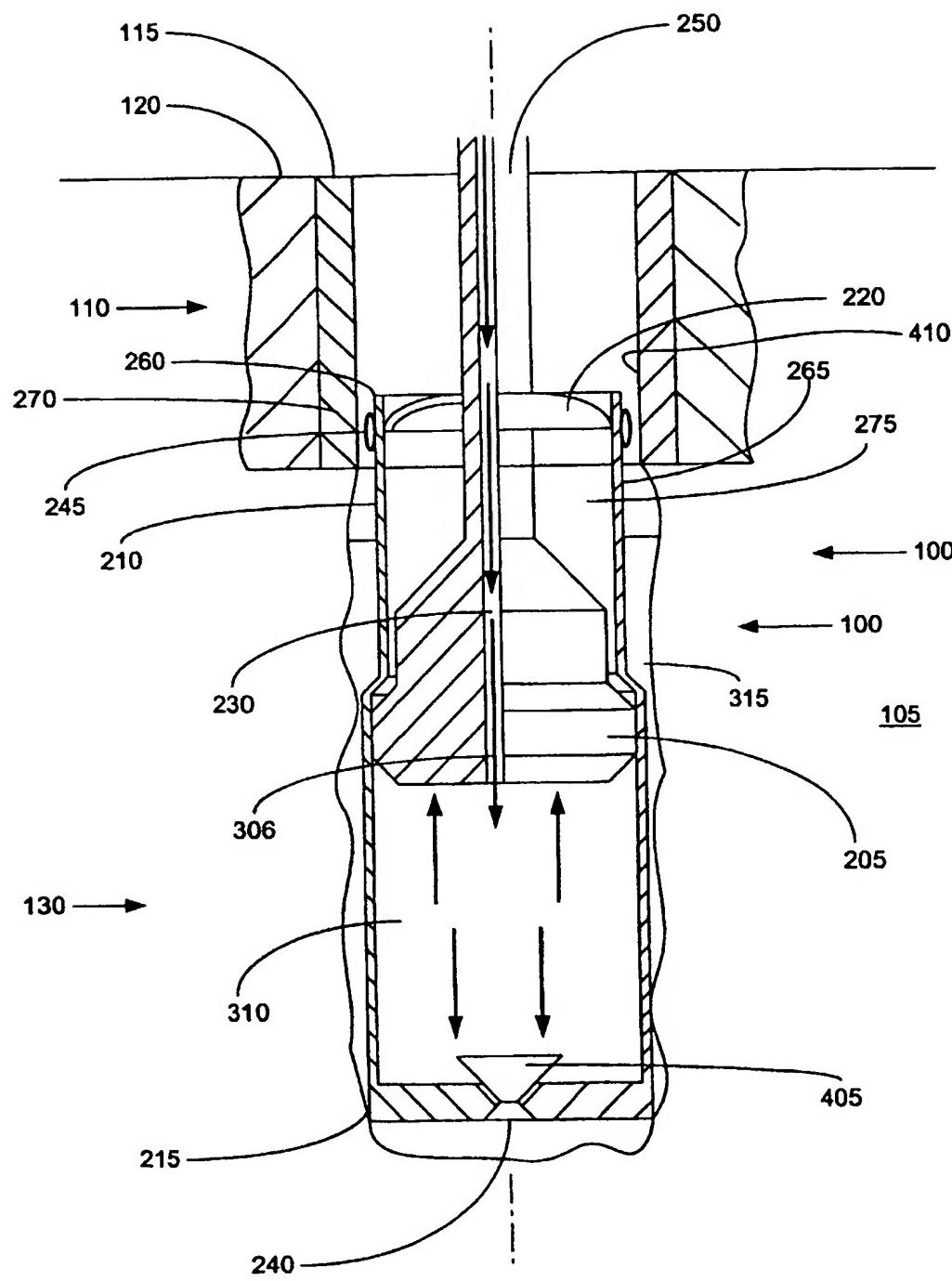


FIGURE 4

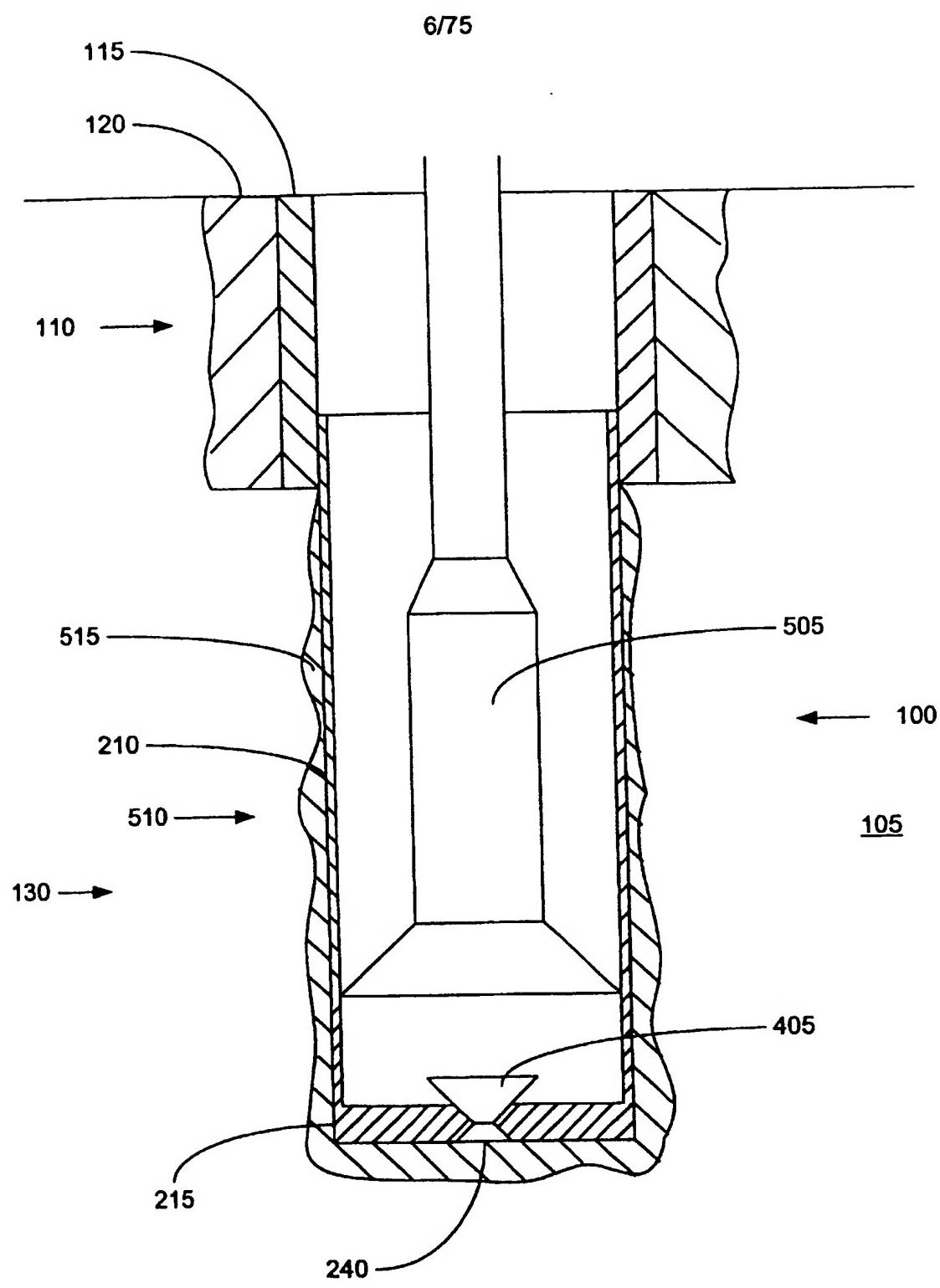


FIGURE 5

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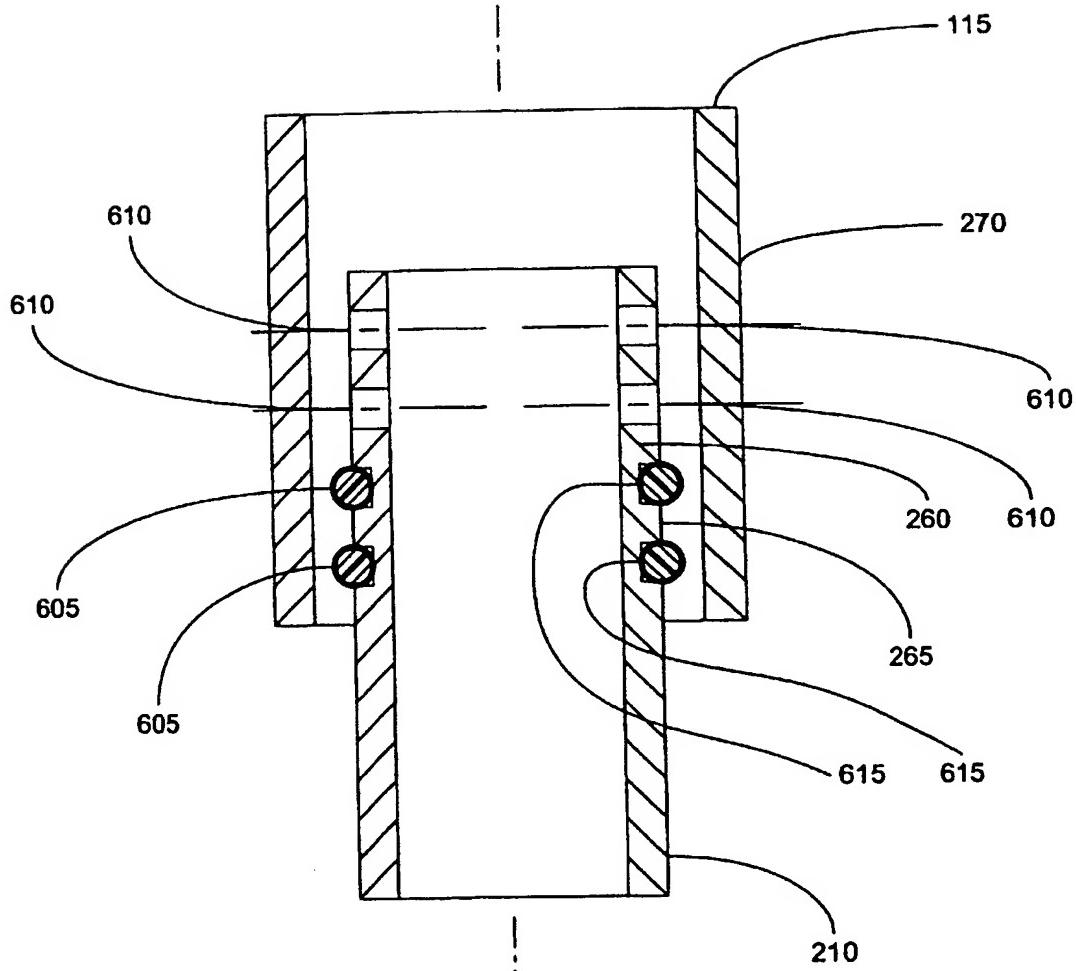


FIGURE 6

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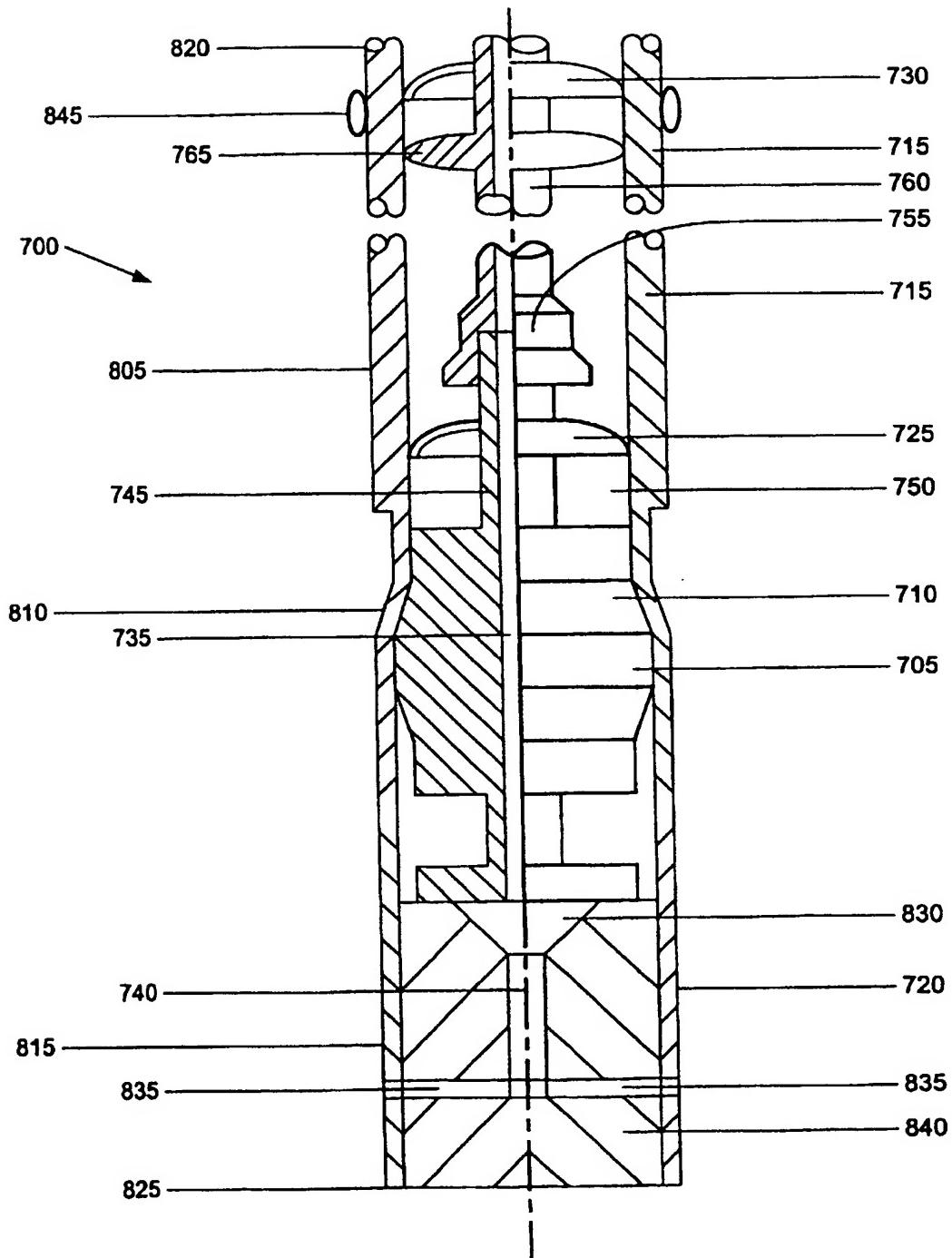


FIGURE 7

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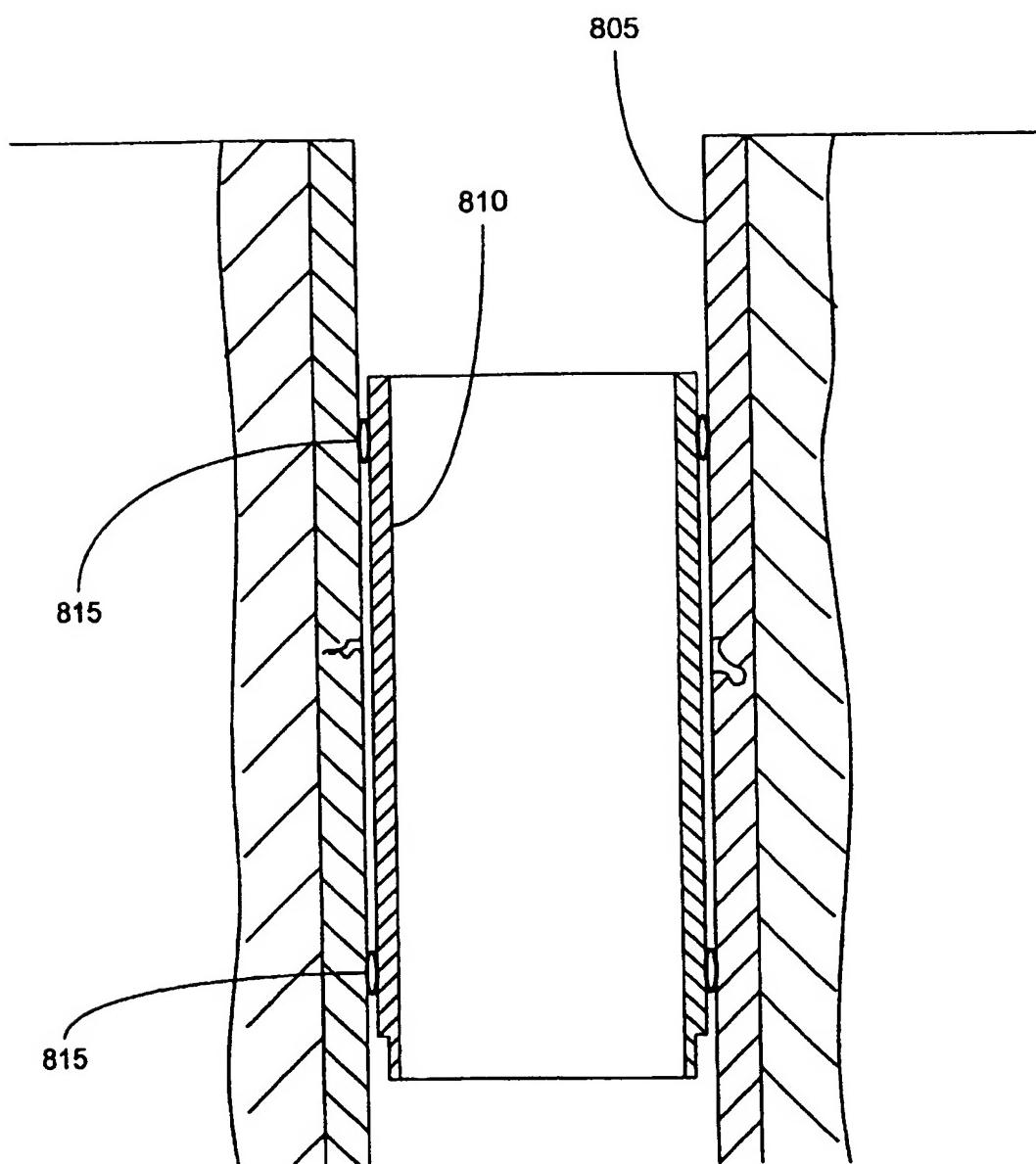


FIGURE 8

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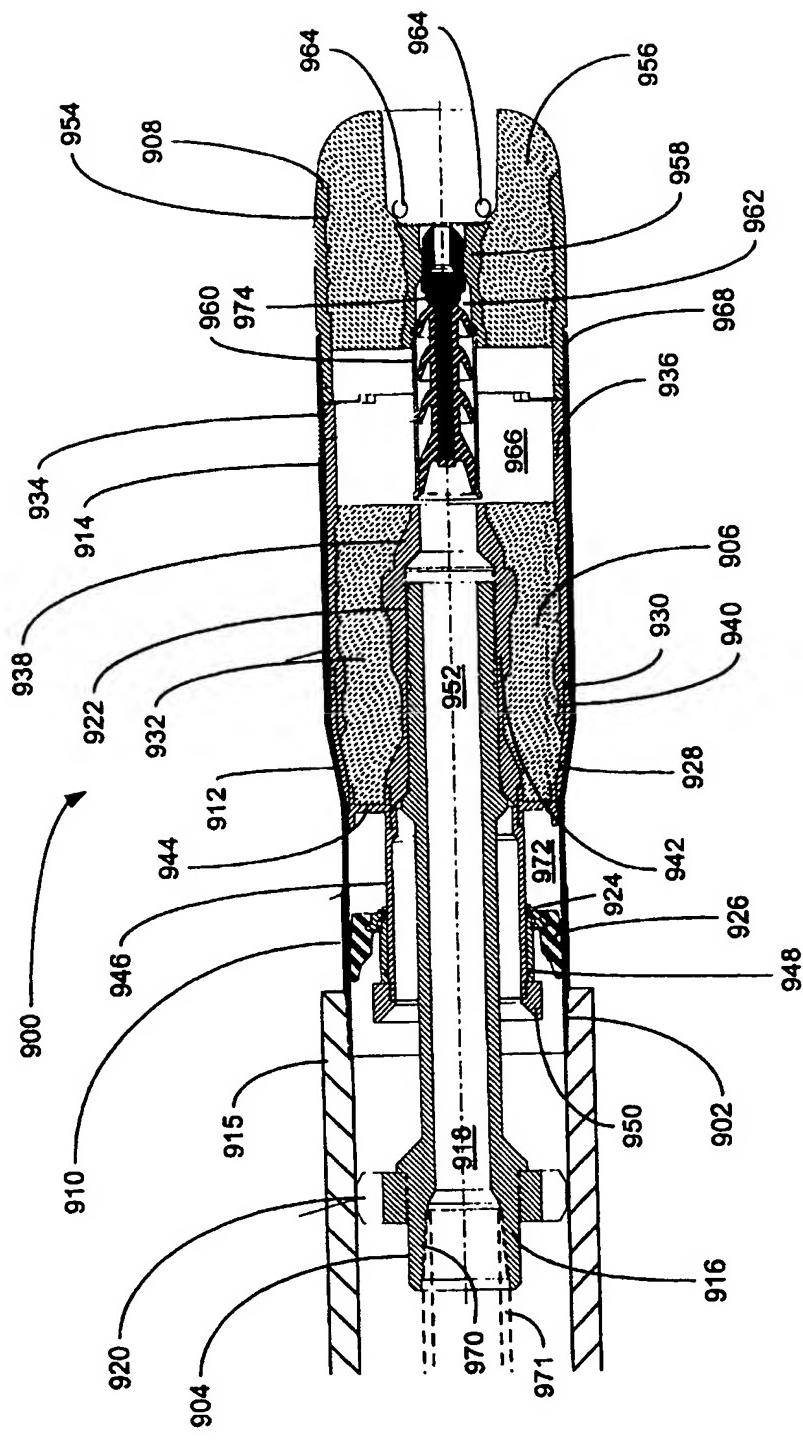


FIGURE 9

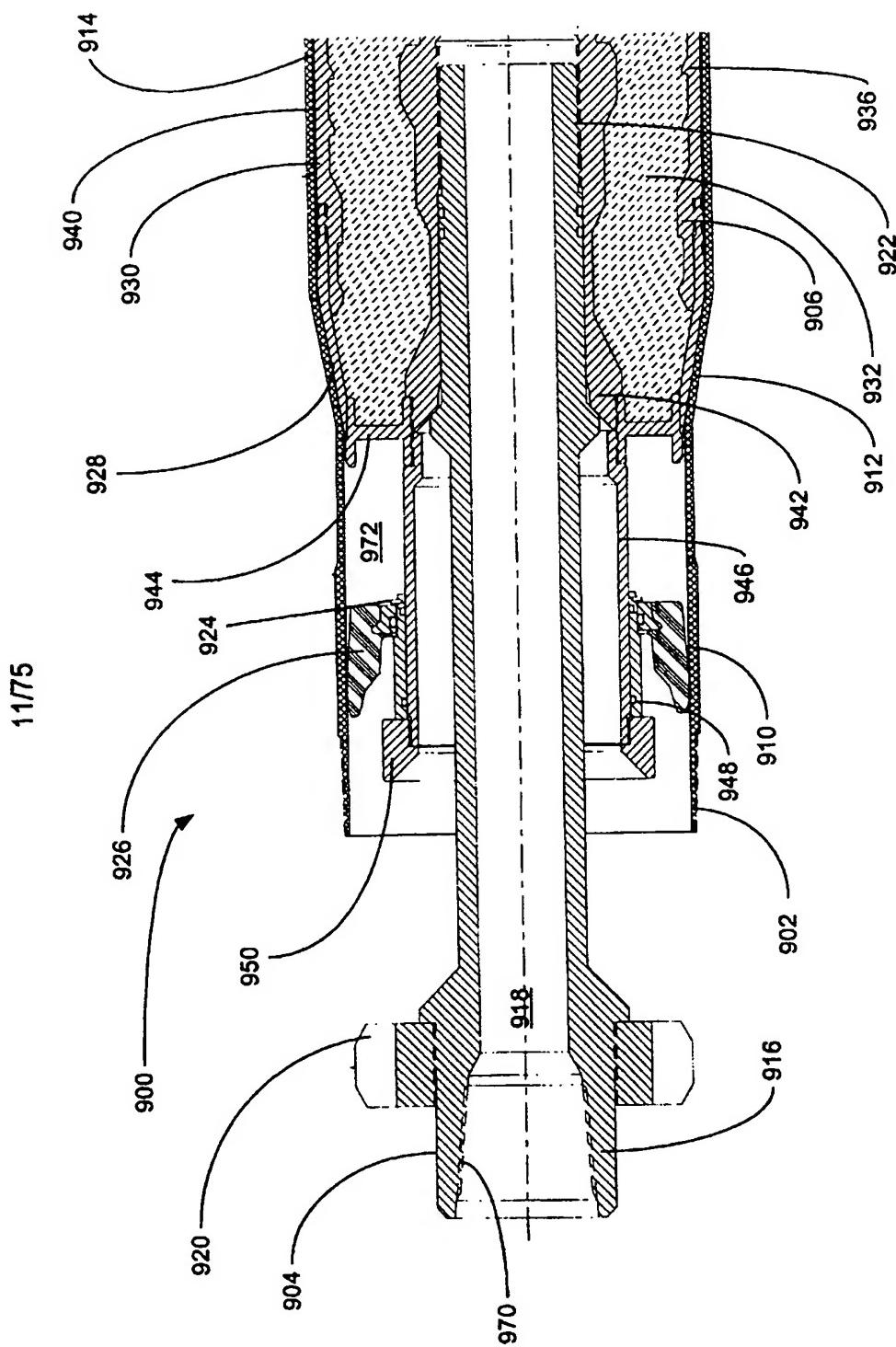


FIGURE 9a

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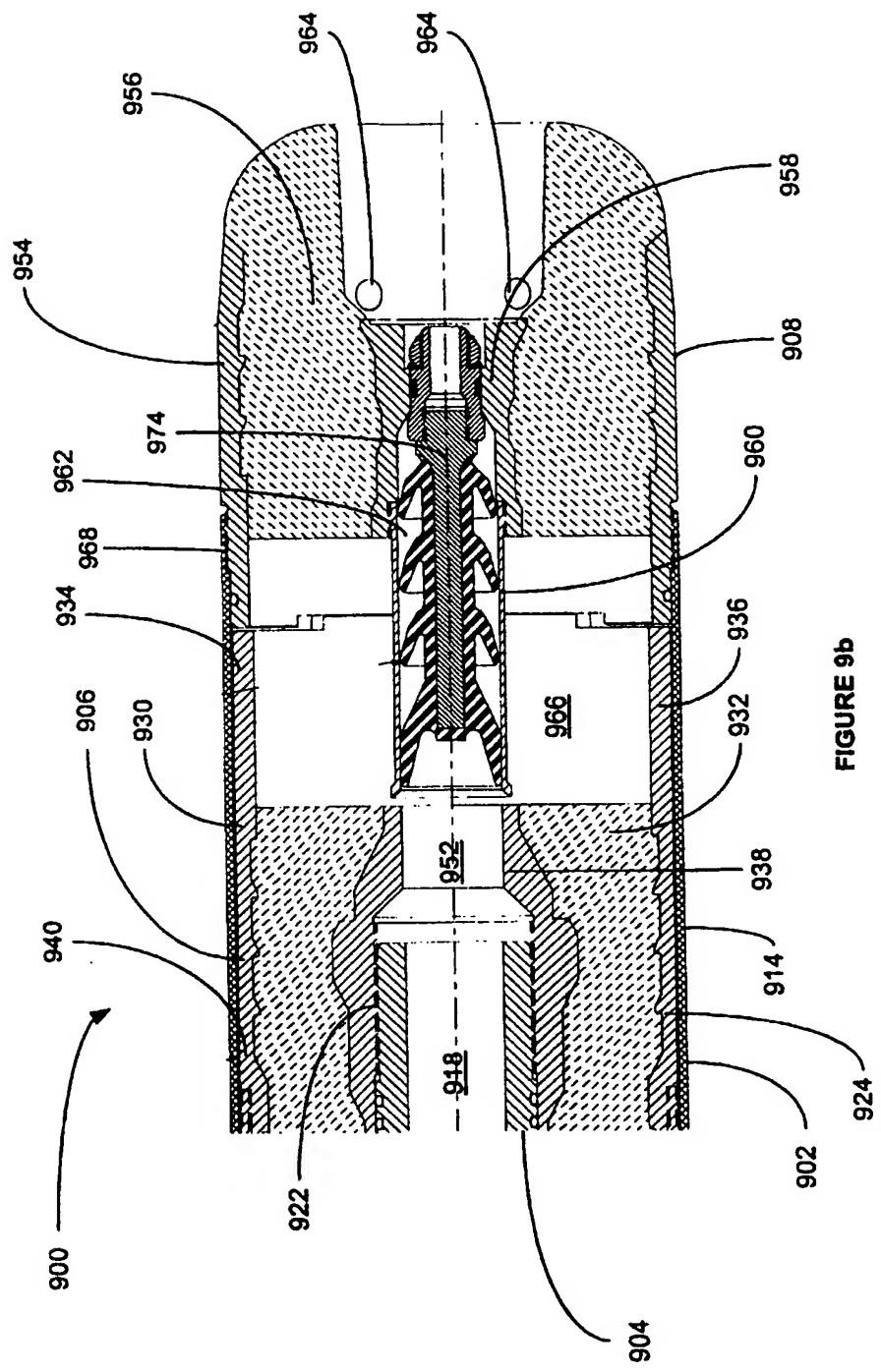
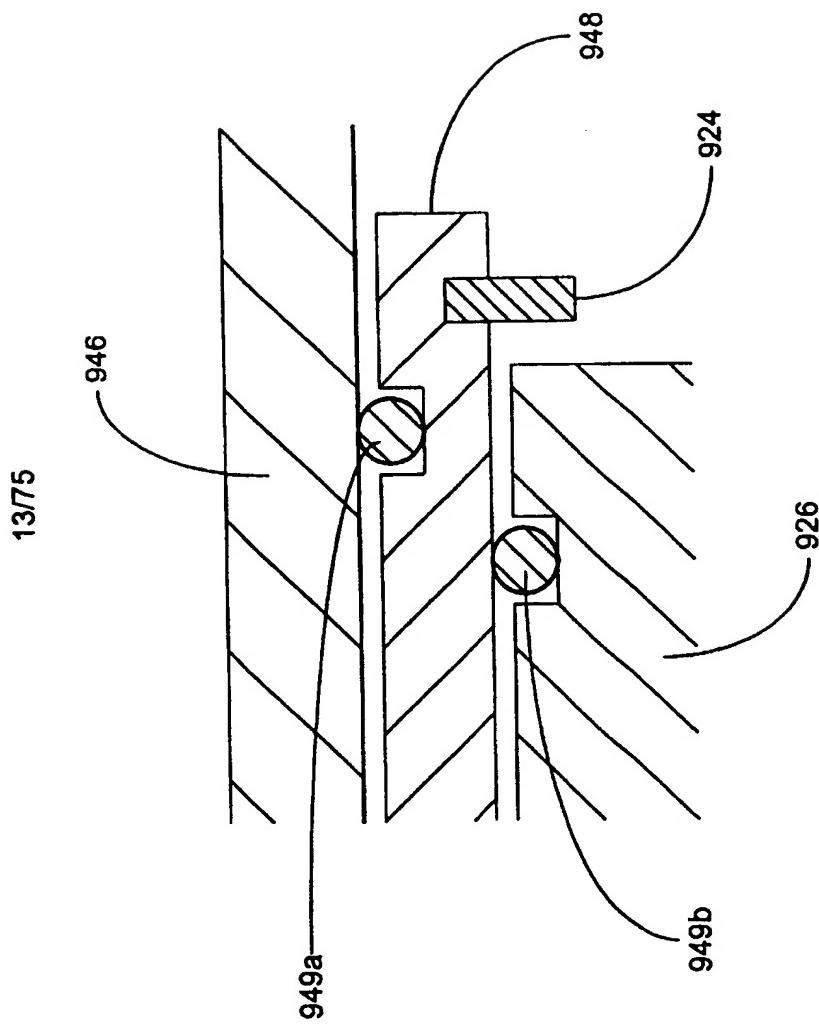


FIGURE 9b

FIGURE 9C



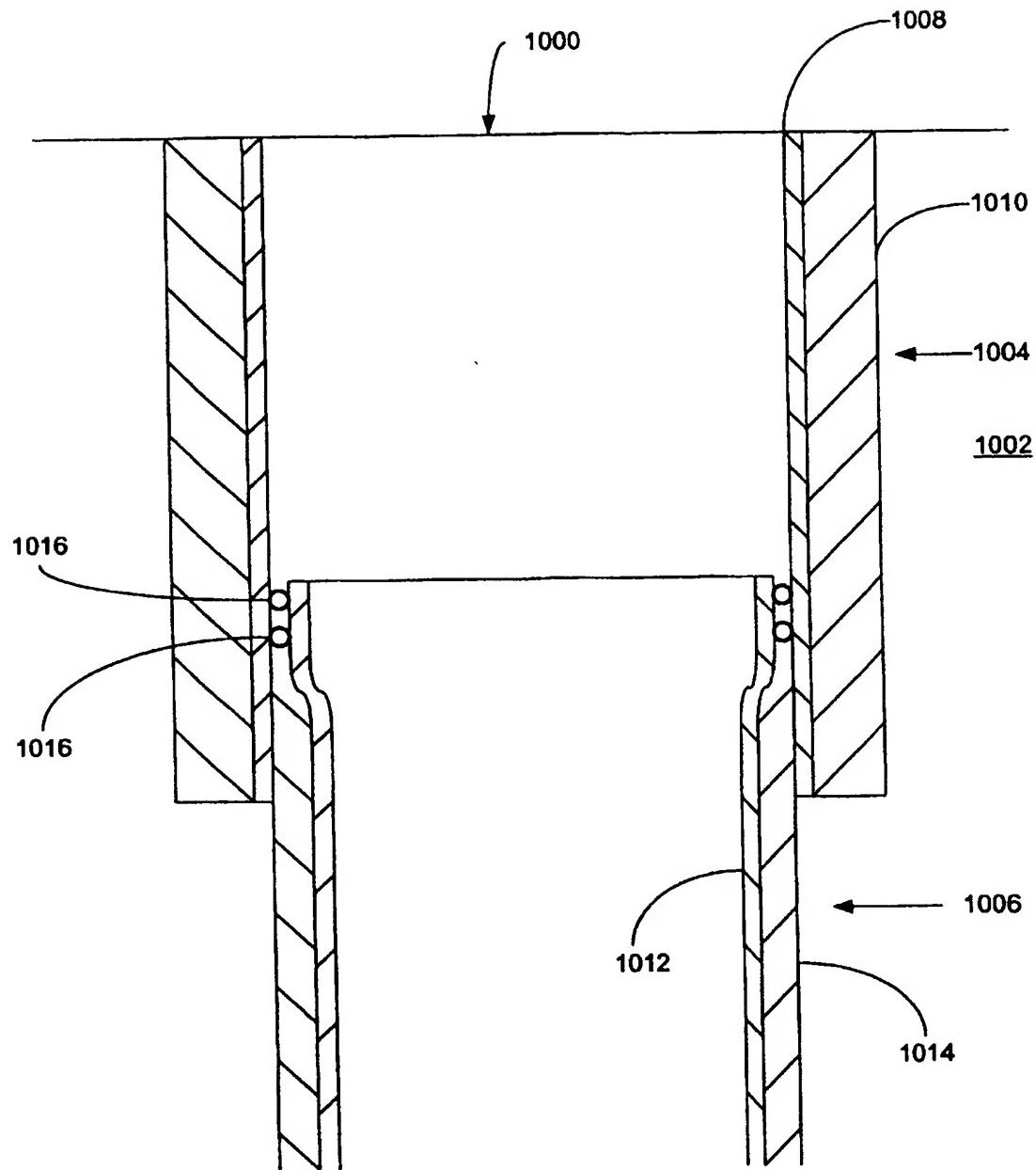


FIGURE 10a

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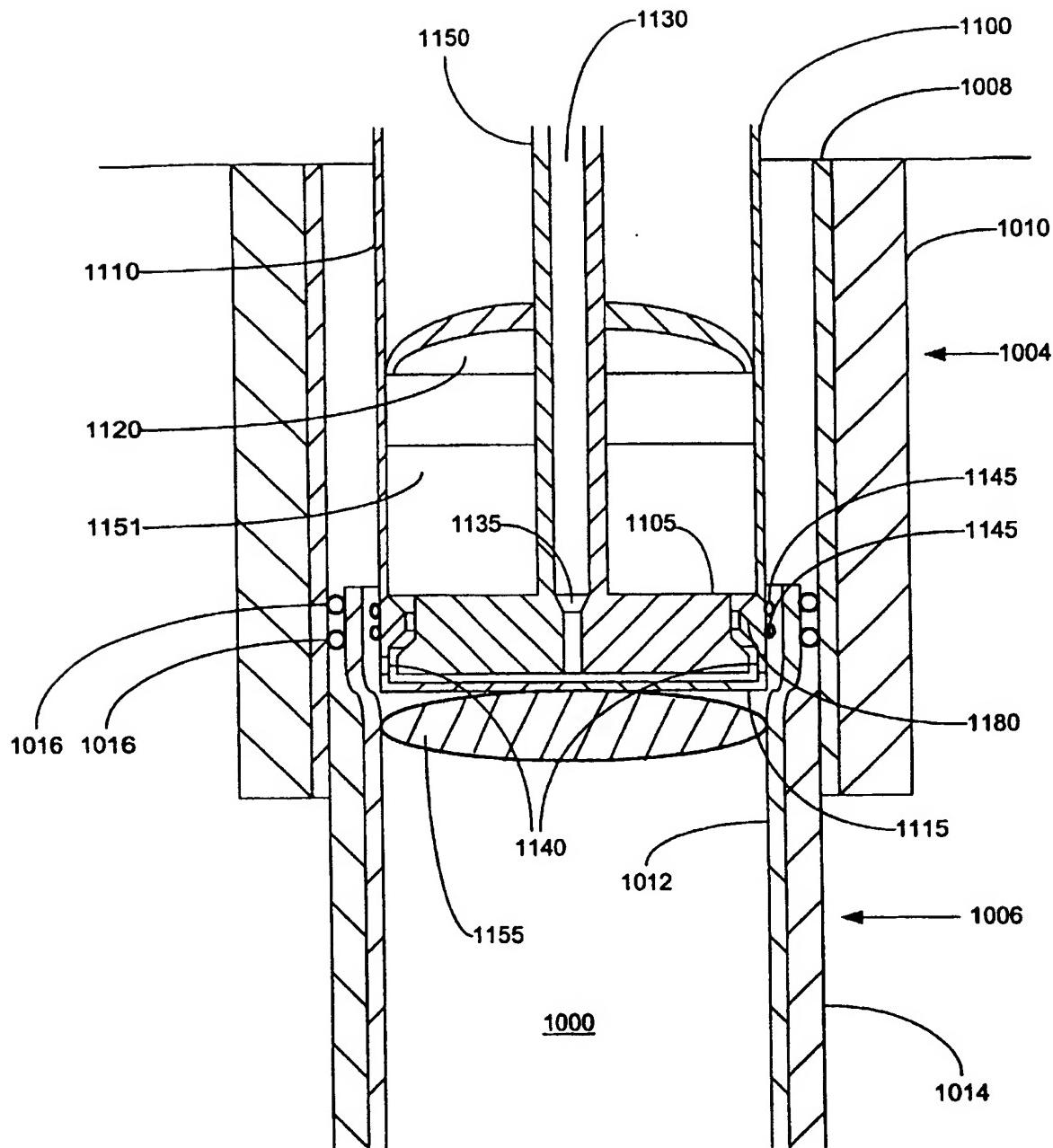


FIGURE 10b

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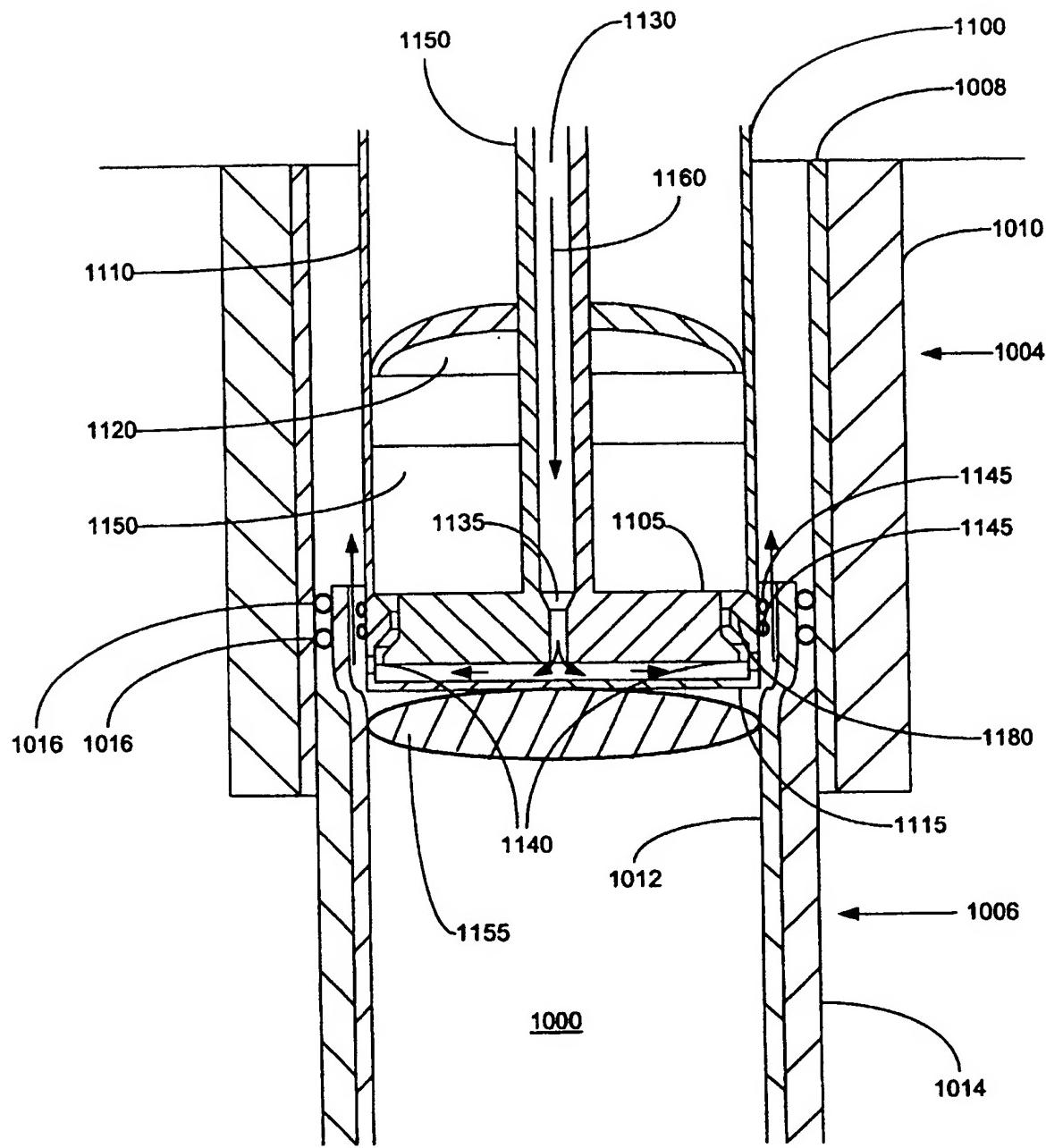


FIGURE 10c

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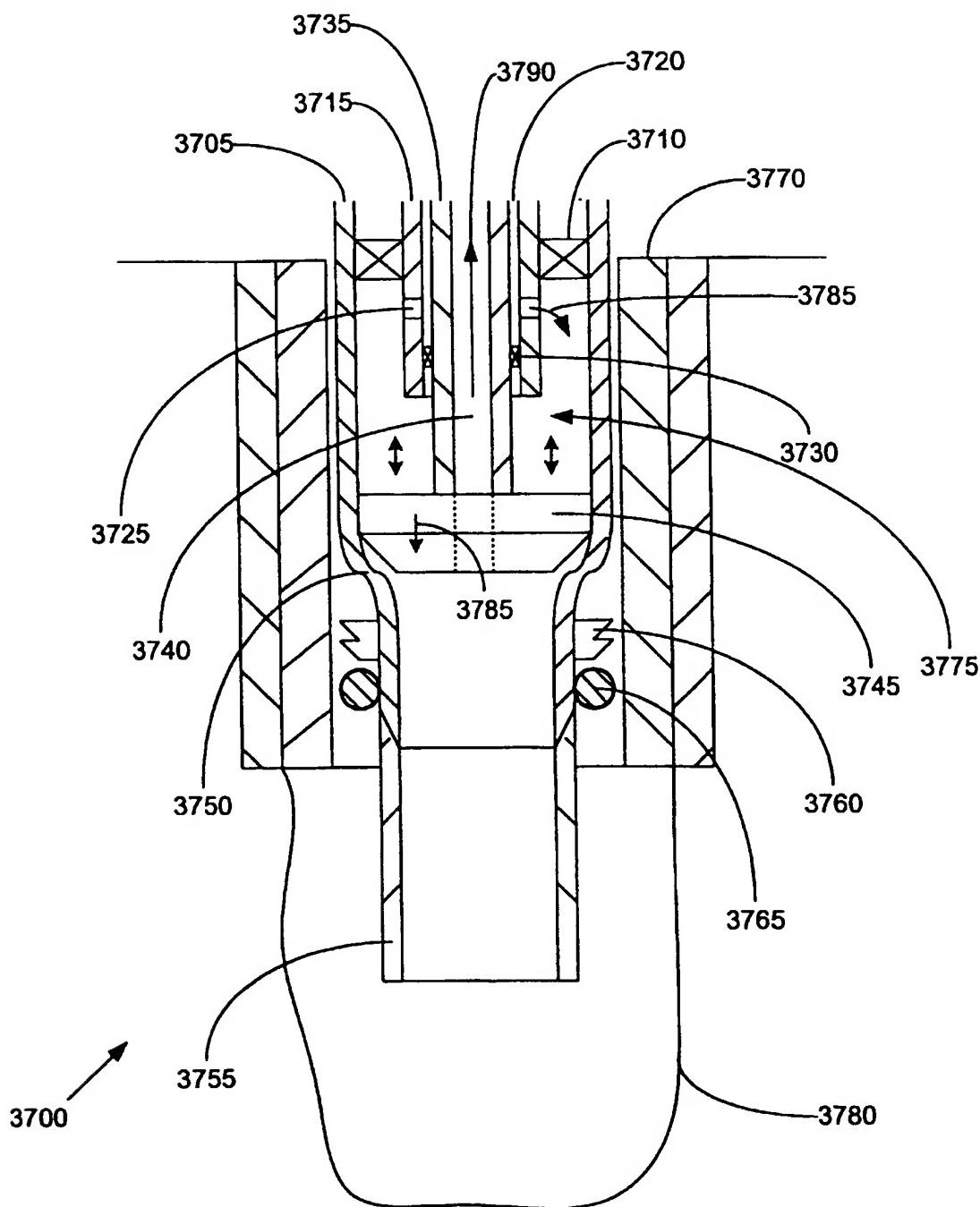


FIGURE 23B

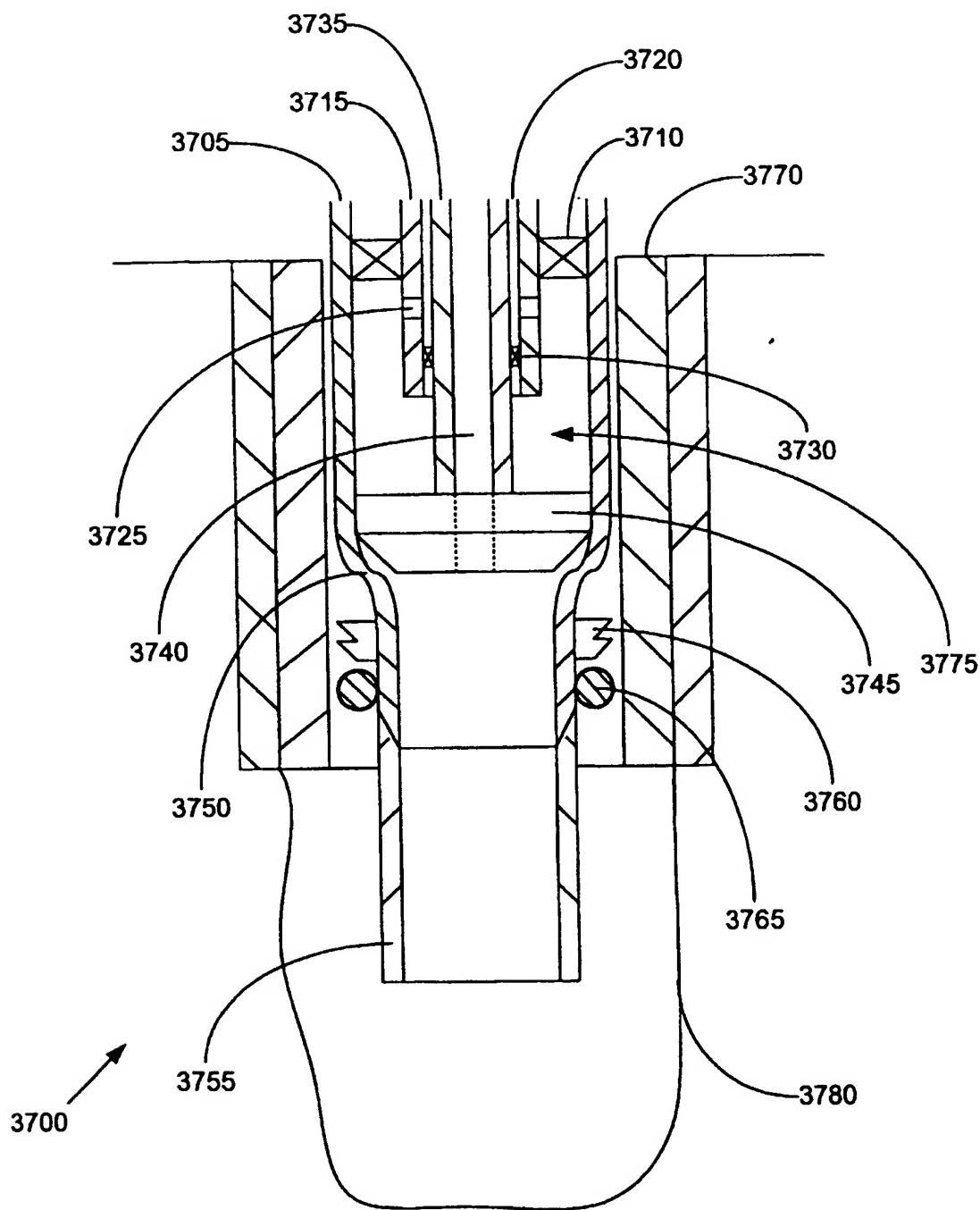


FIGURE 23A

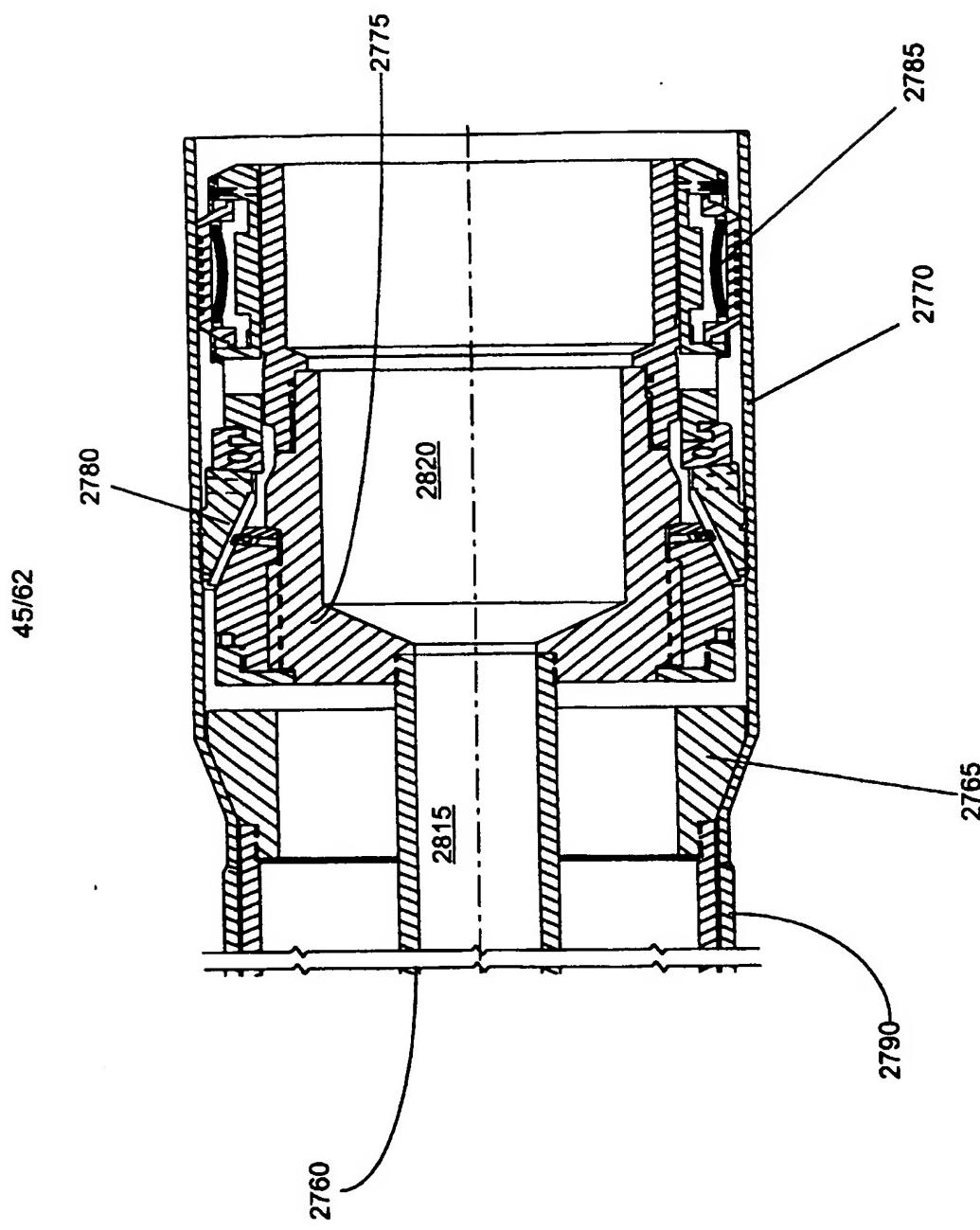


FIGURE 19b

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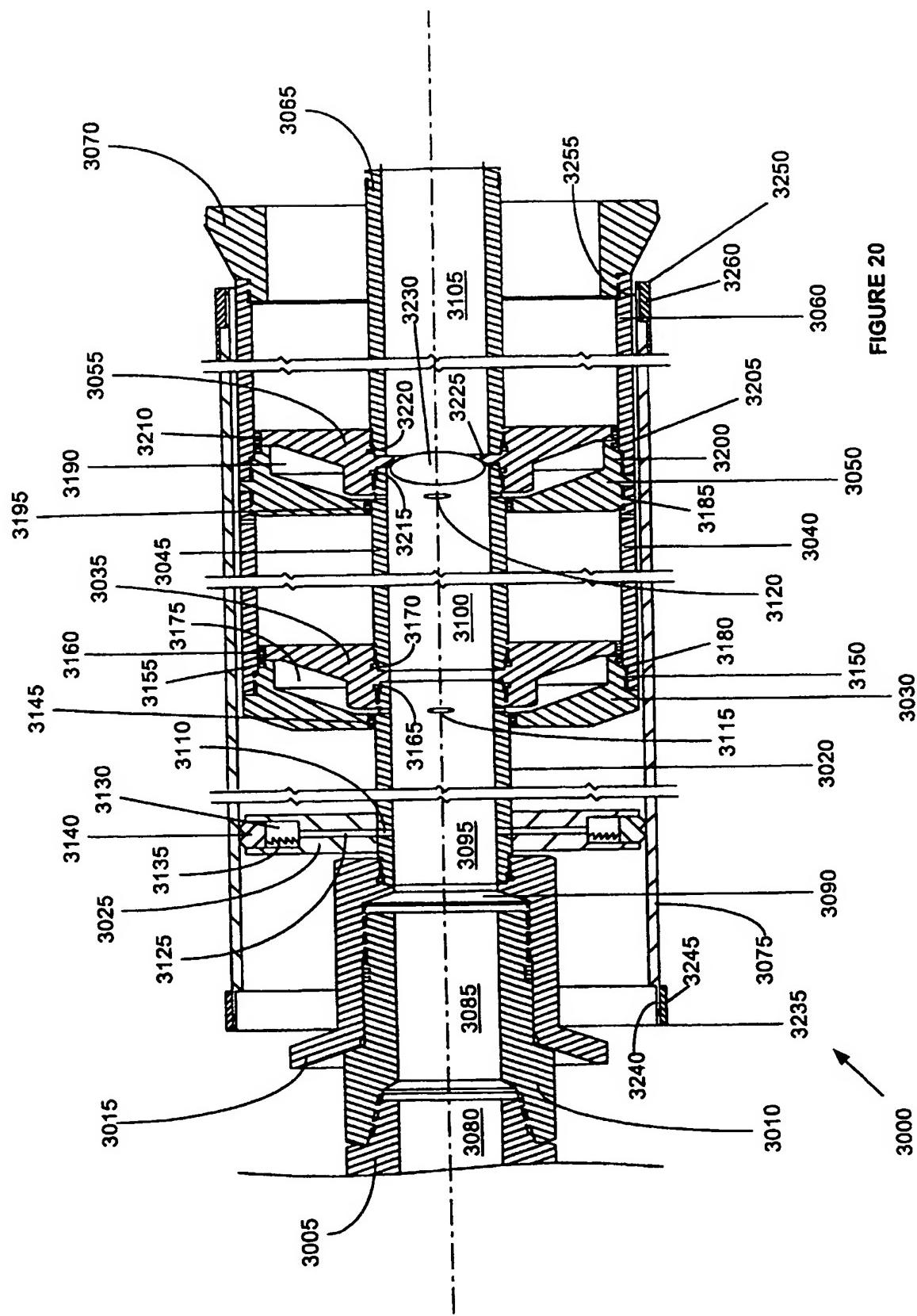


FIGURE 20

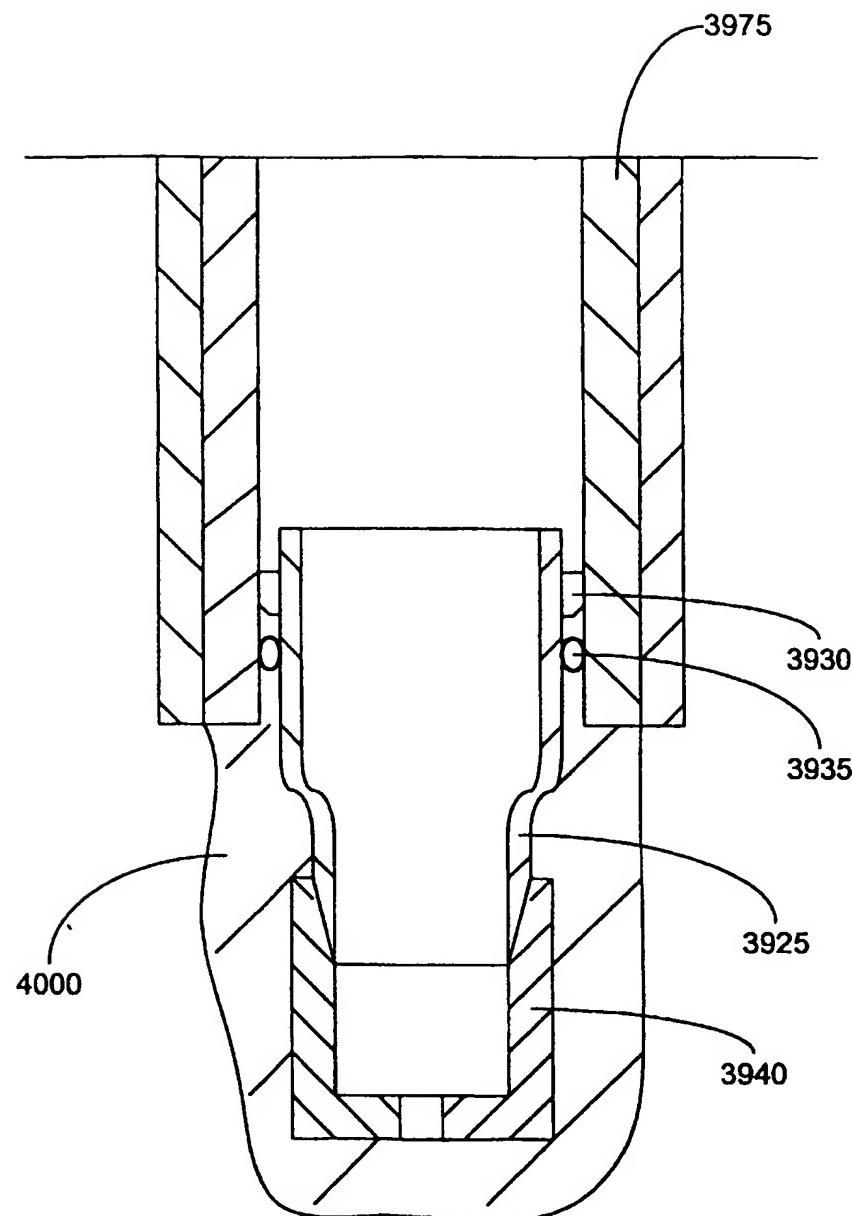


FIGURE 24E

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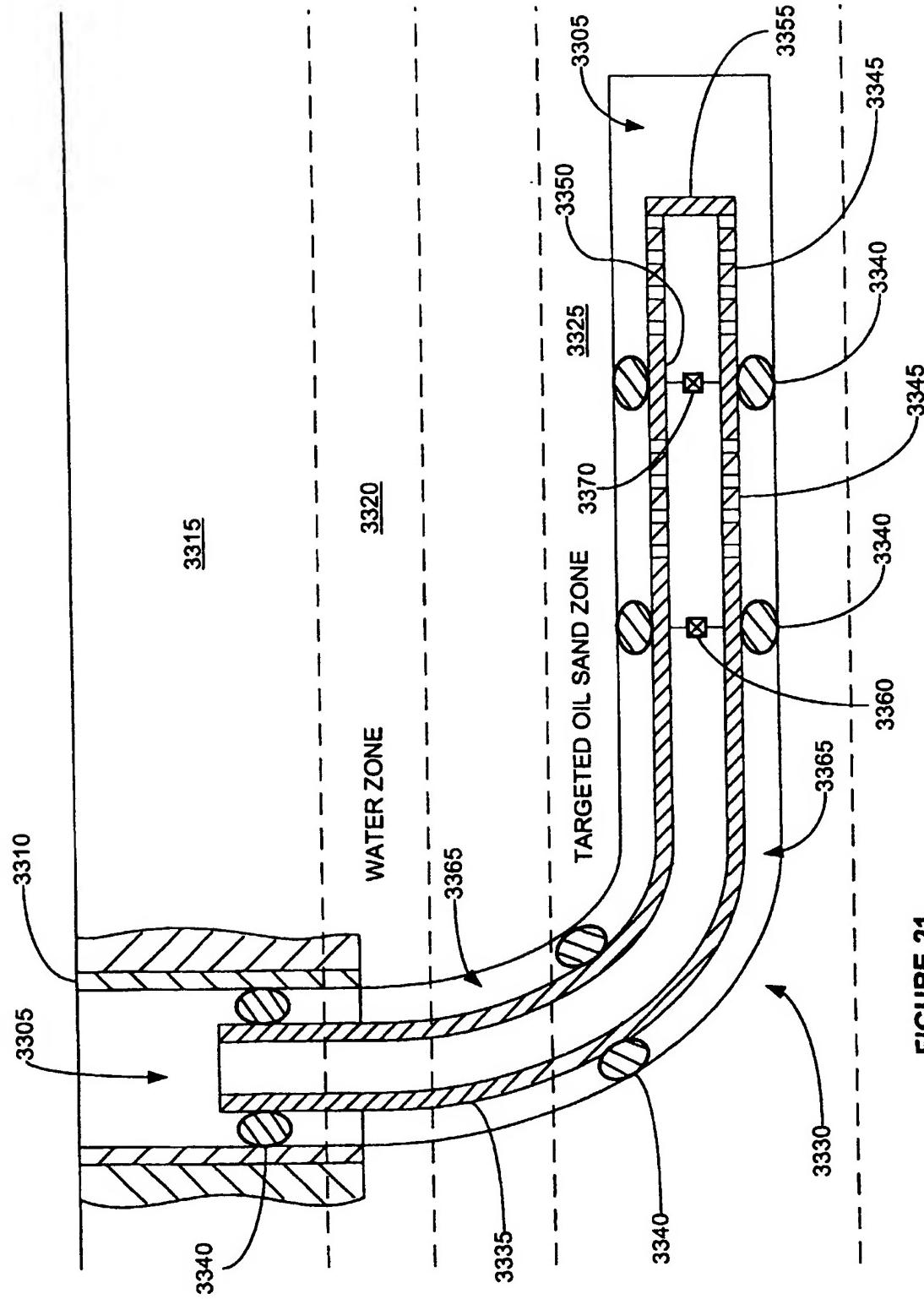


FIGURE 21

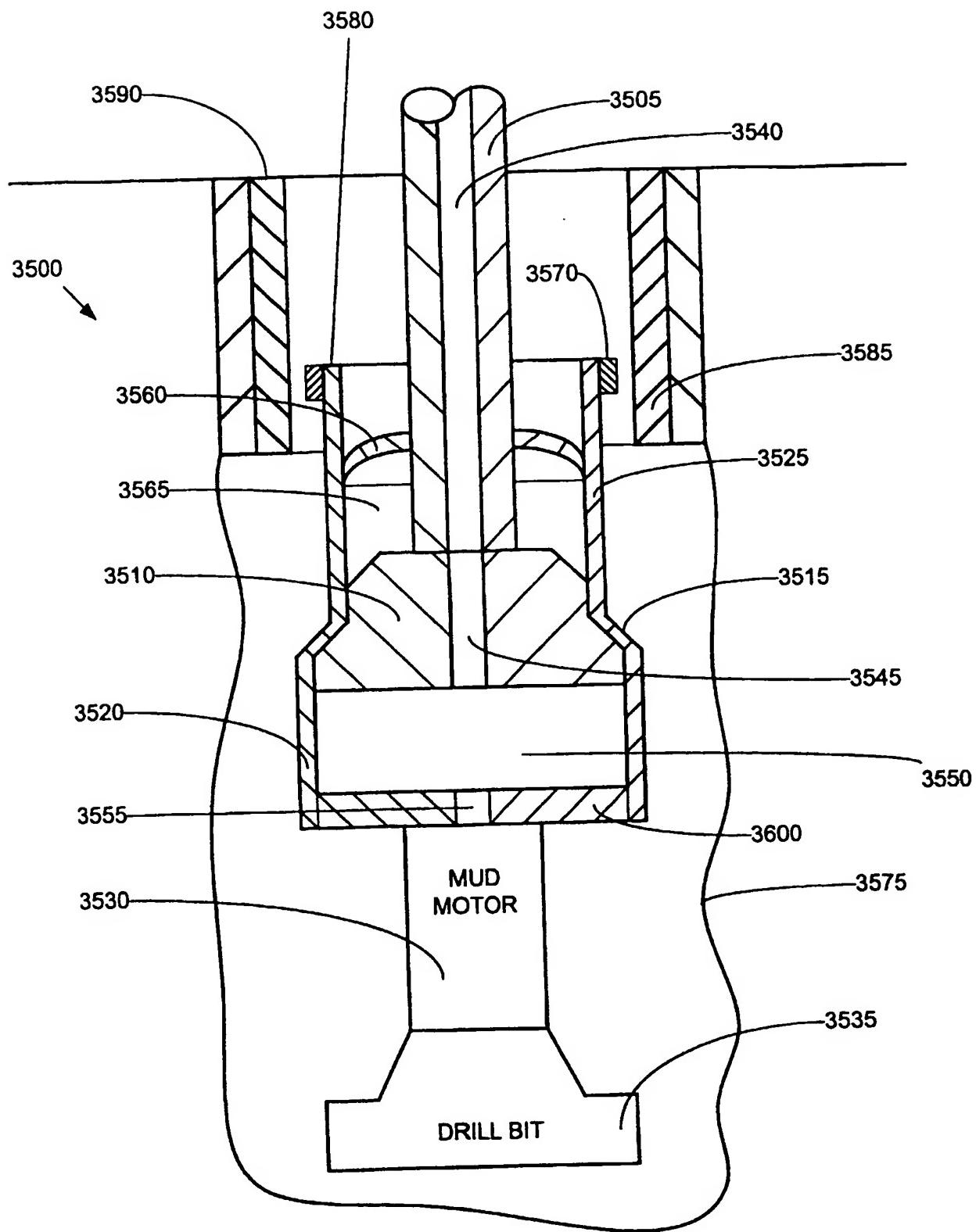


FIGURE 22A

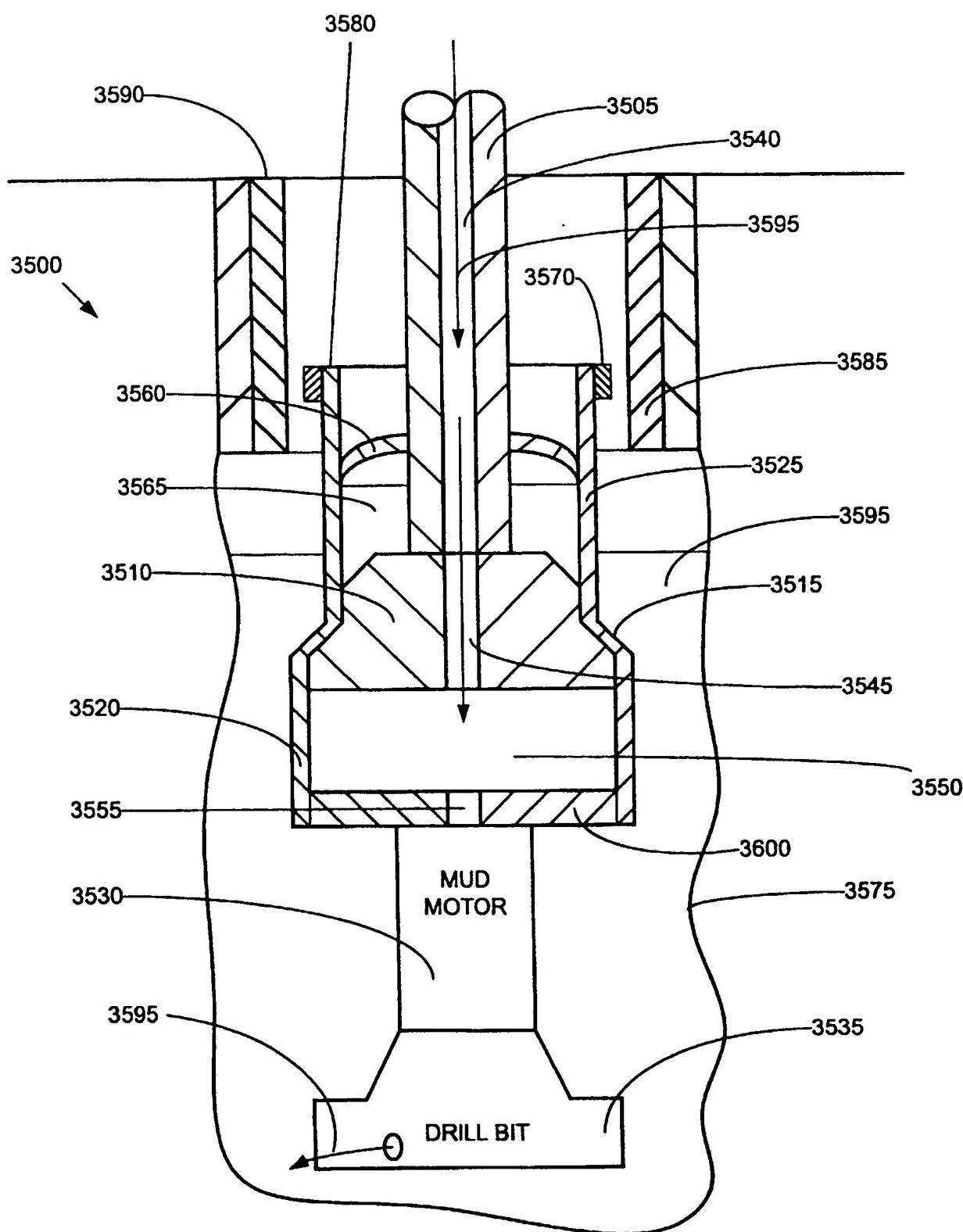


FIGURE 22B

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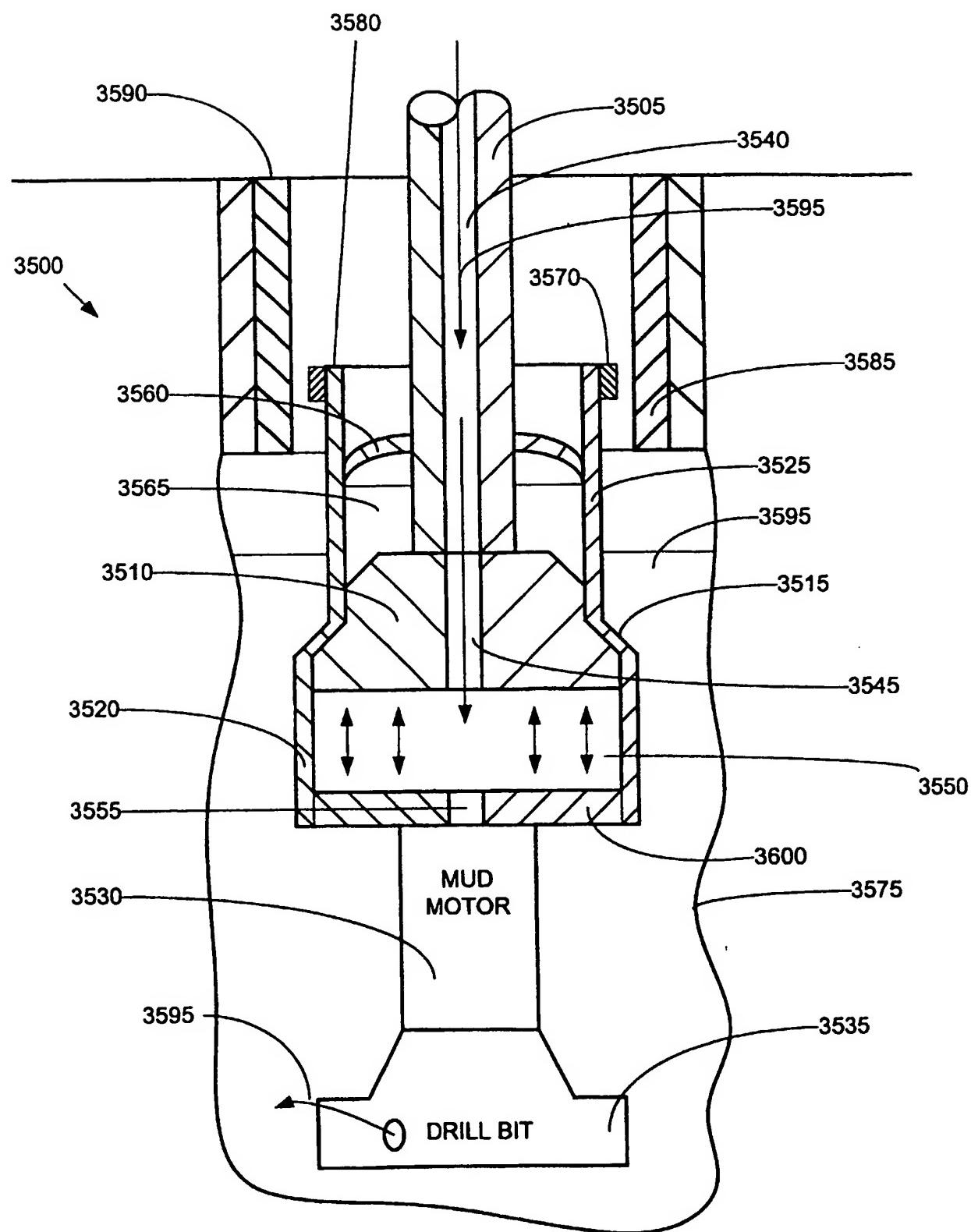


FIGURE 22C

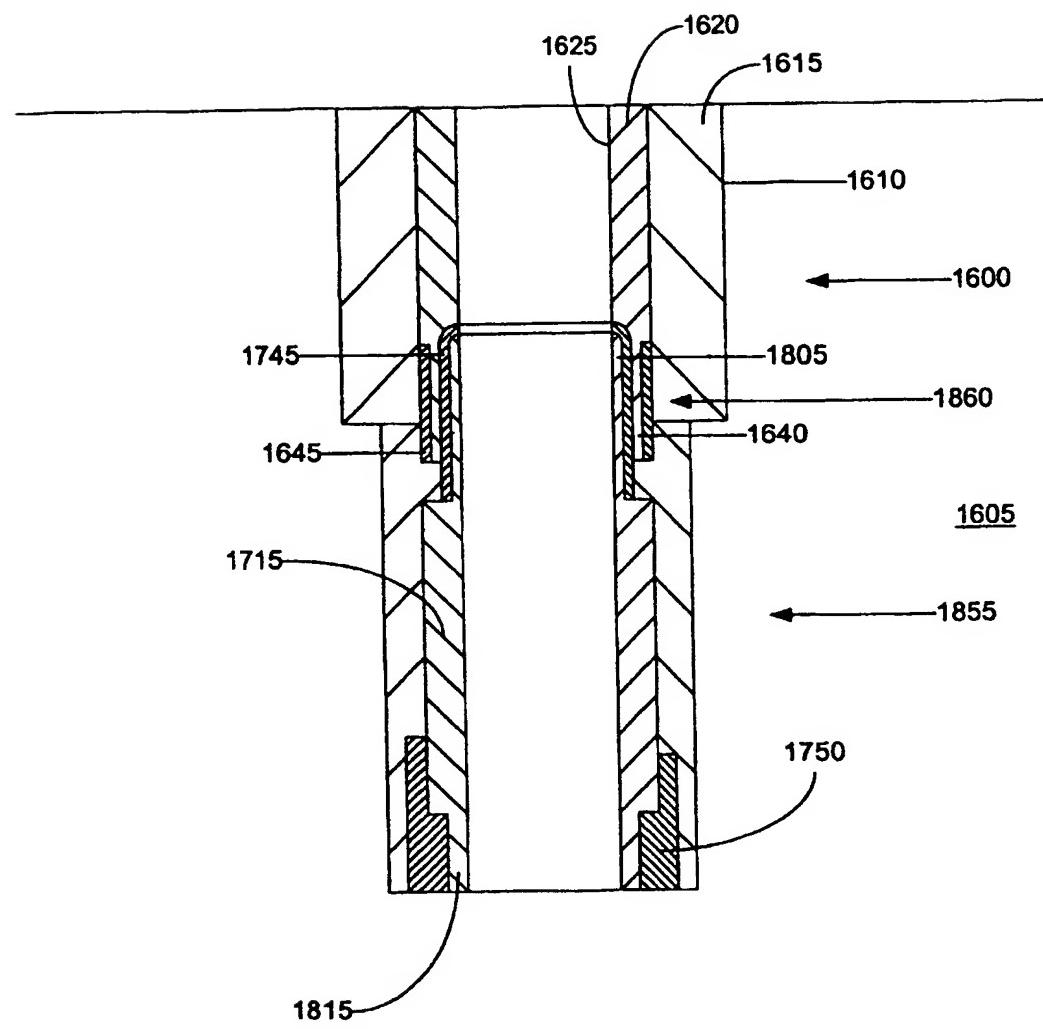


FIGURE 14f

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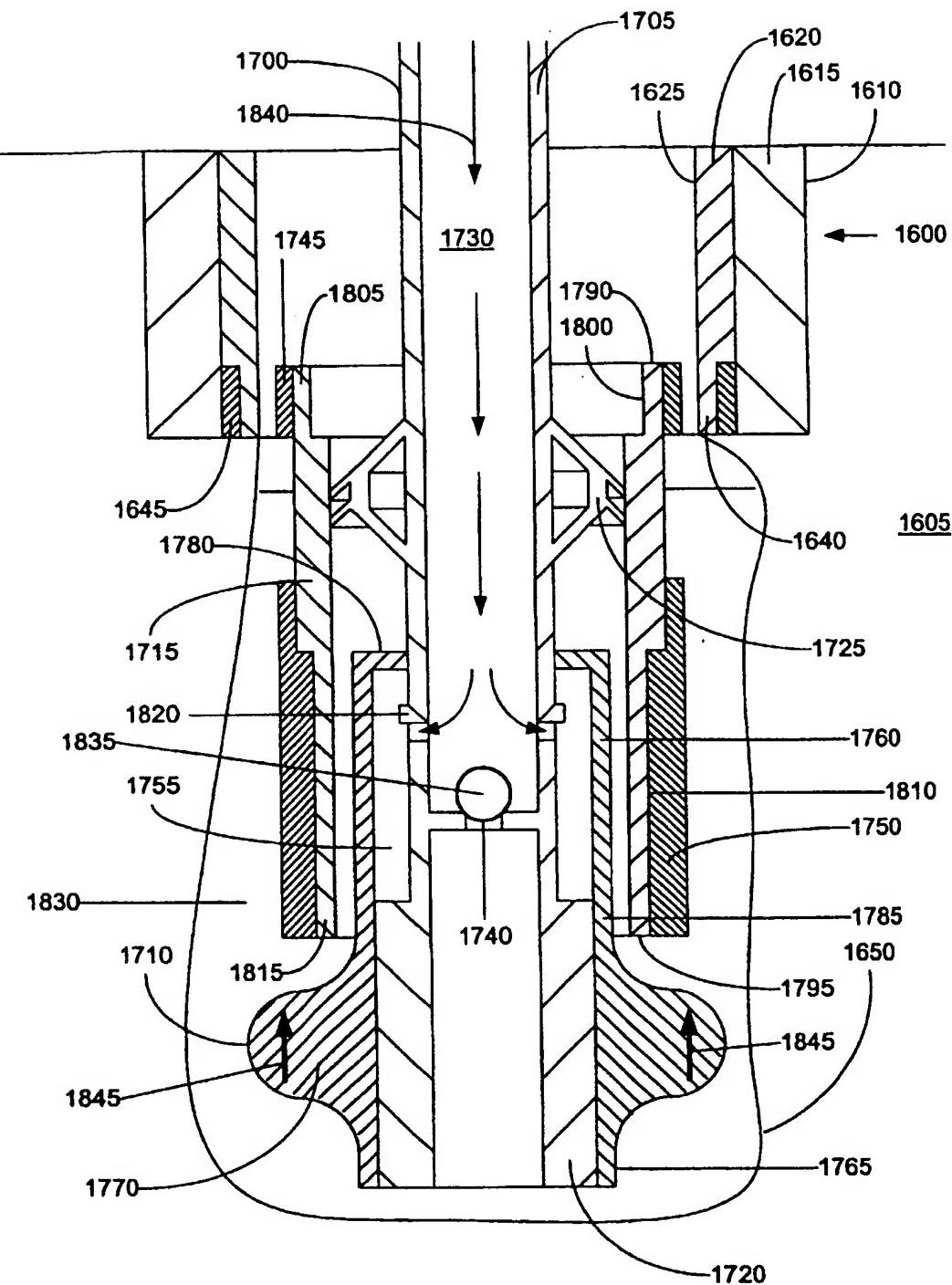


FIGURE 14e

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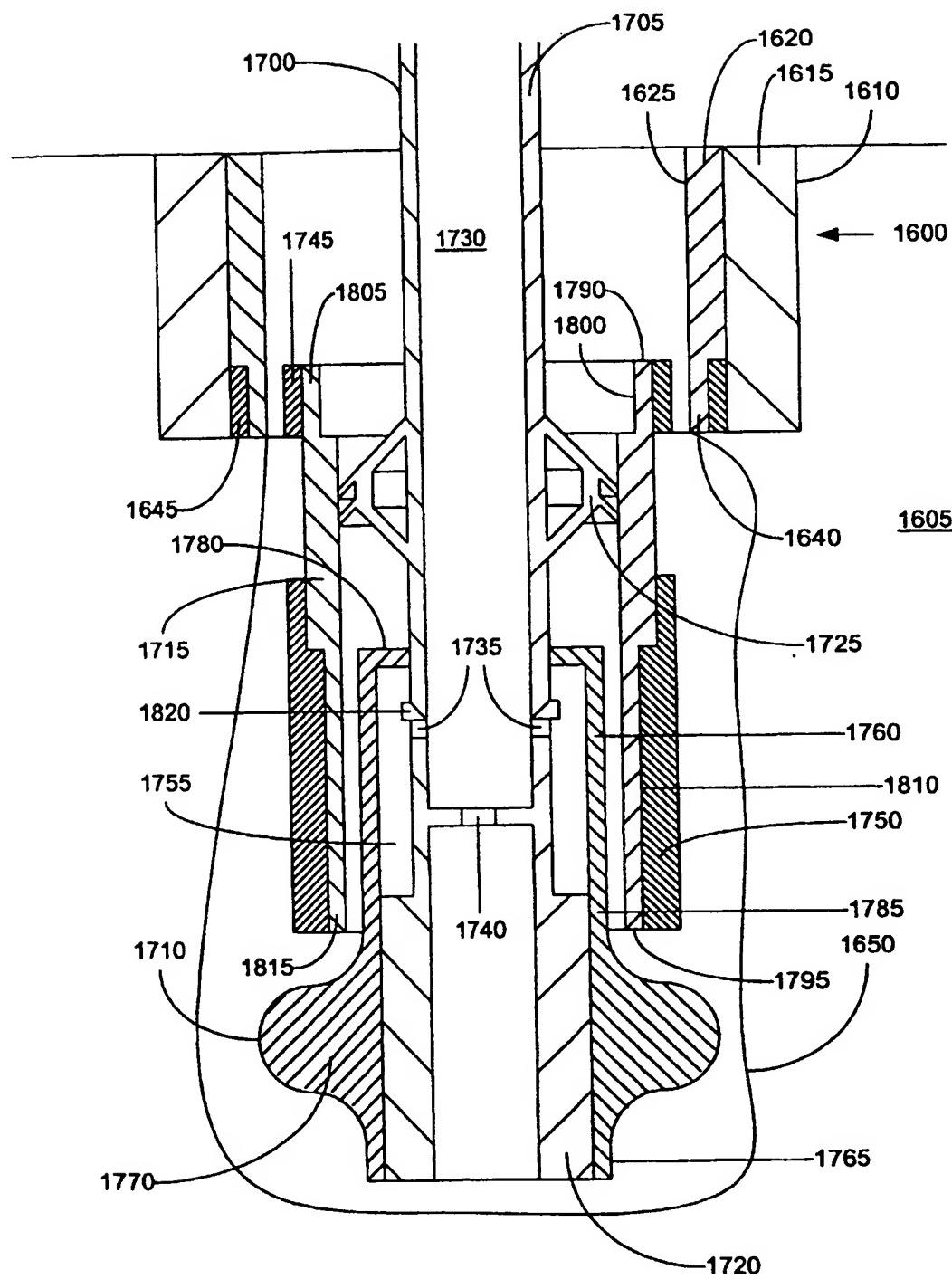


FIGURE 14c

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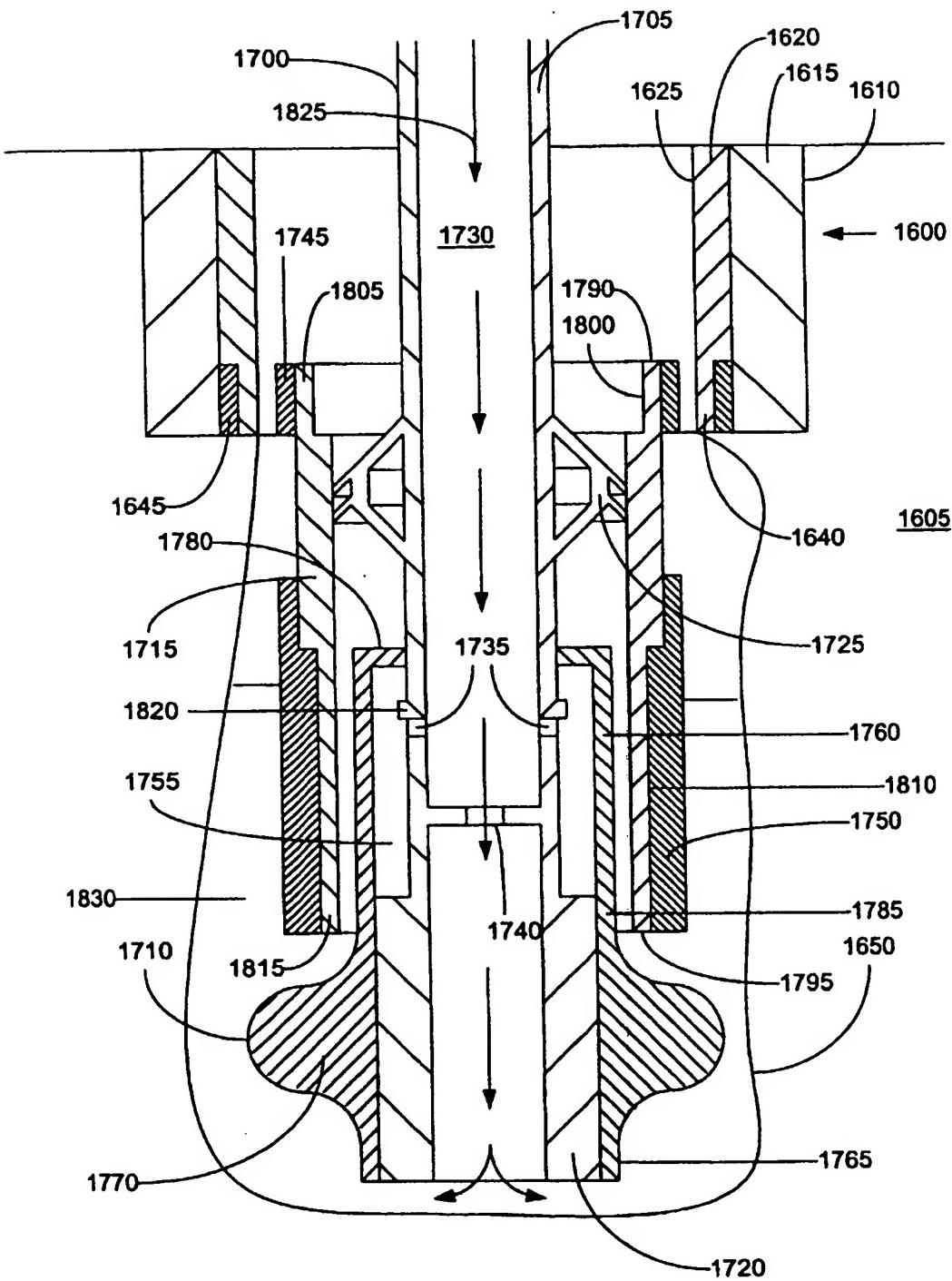
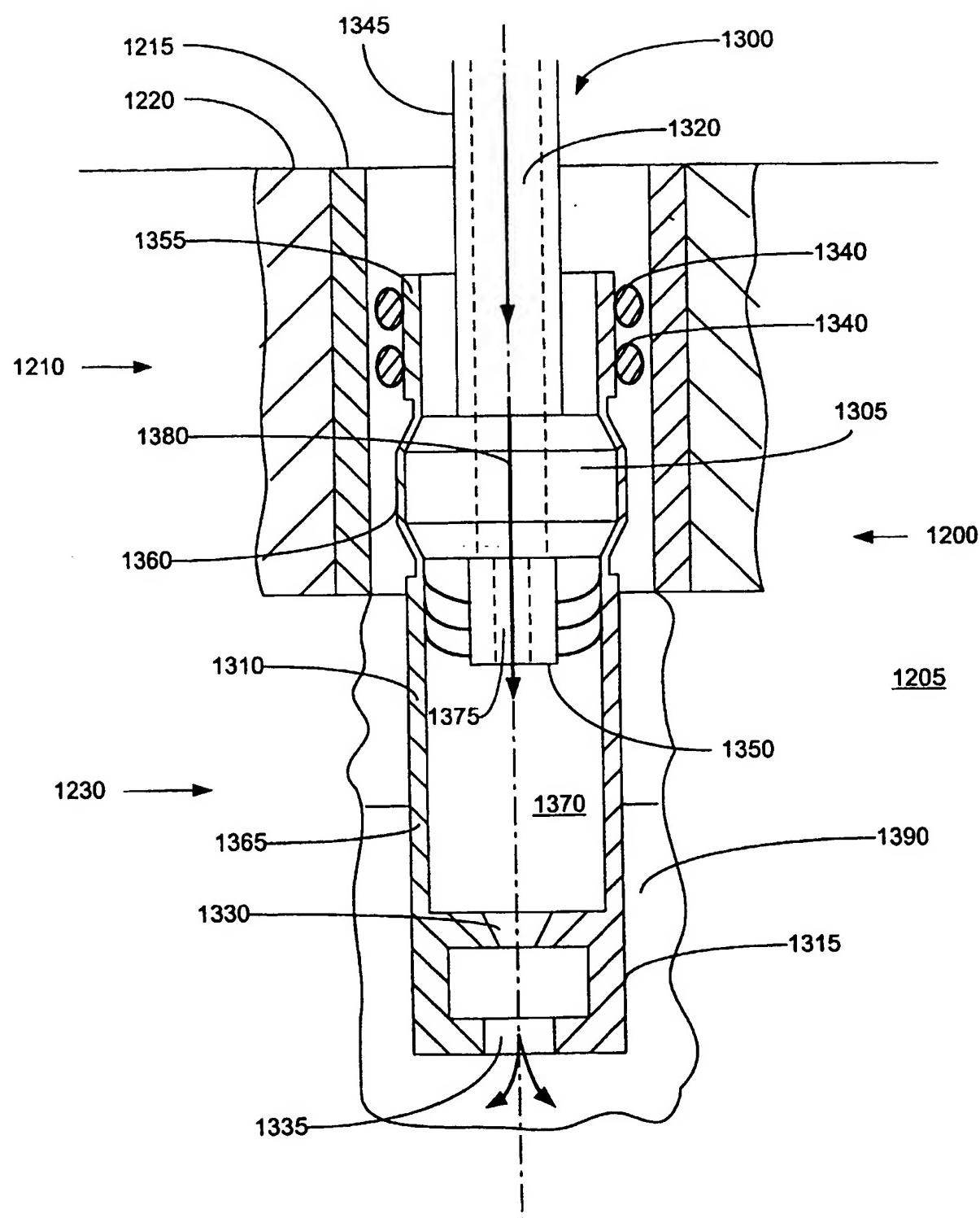


FIGURE 14d

**FIGURE 11c**

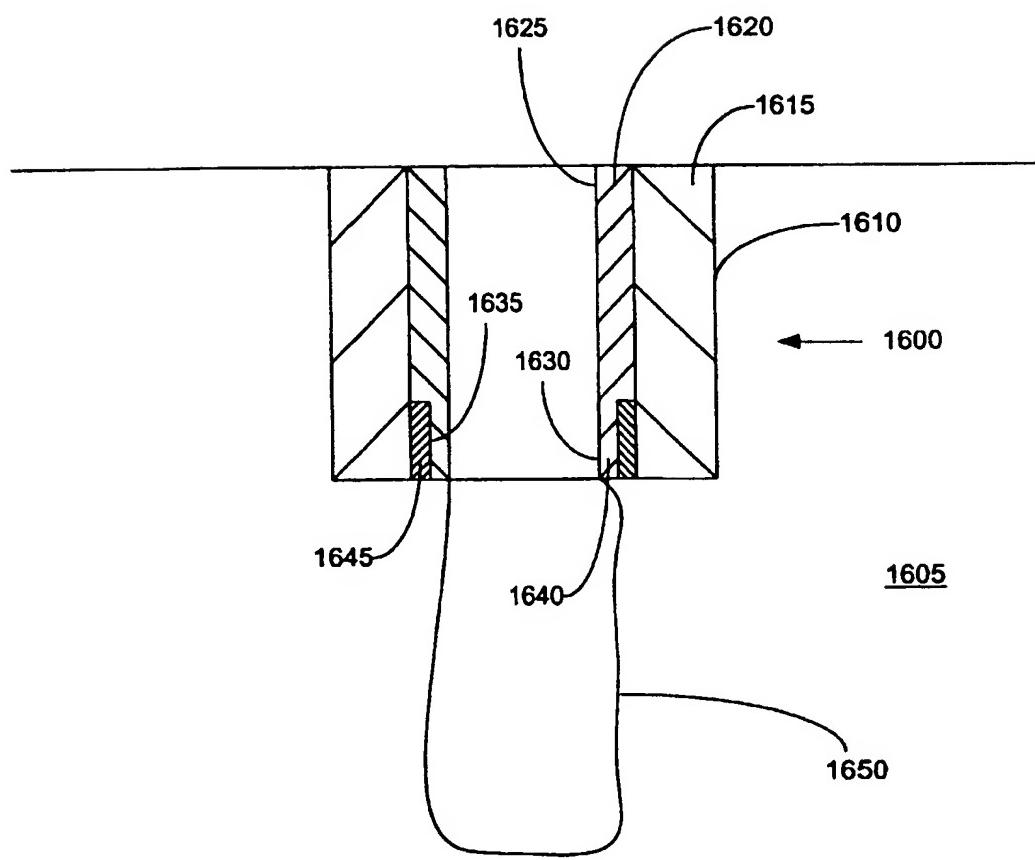


FIGURE 14b

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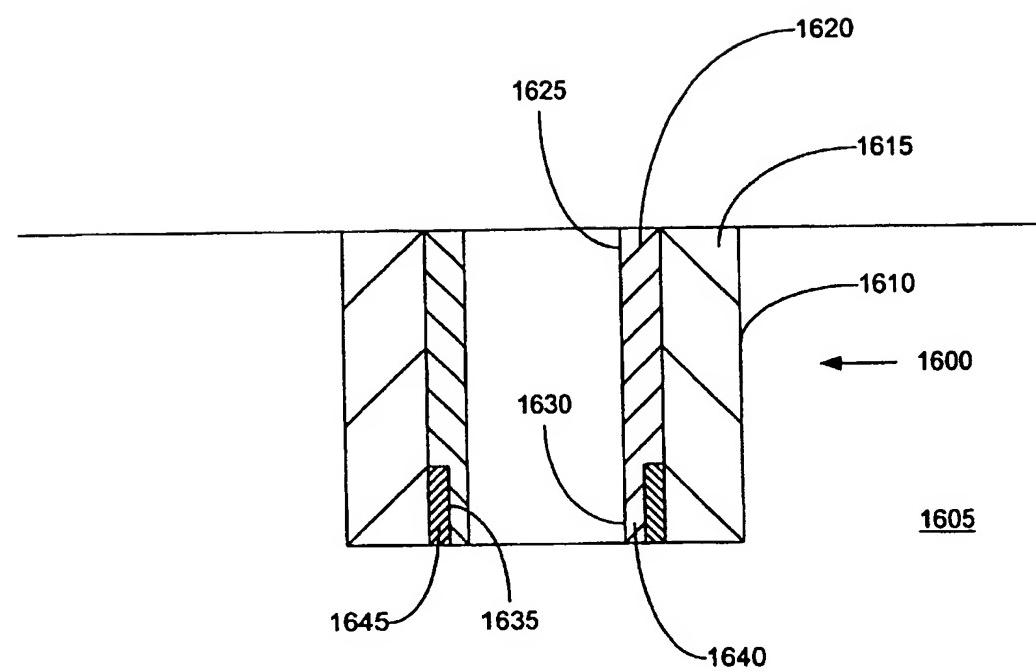


FIGURE 14a

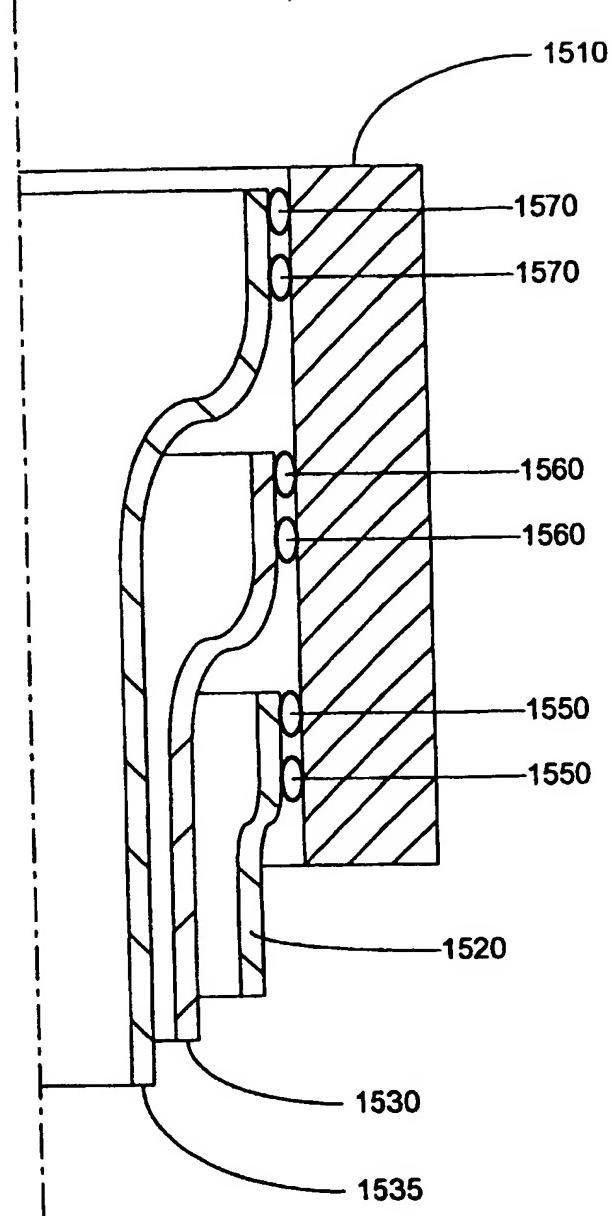


FIGURE 13

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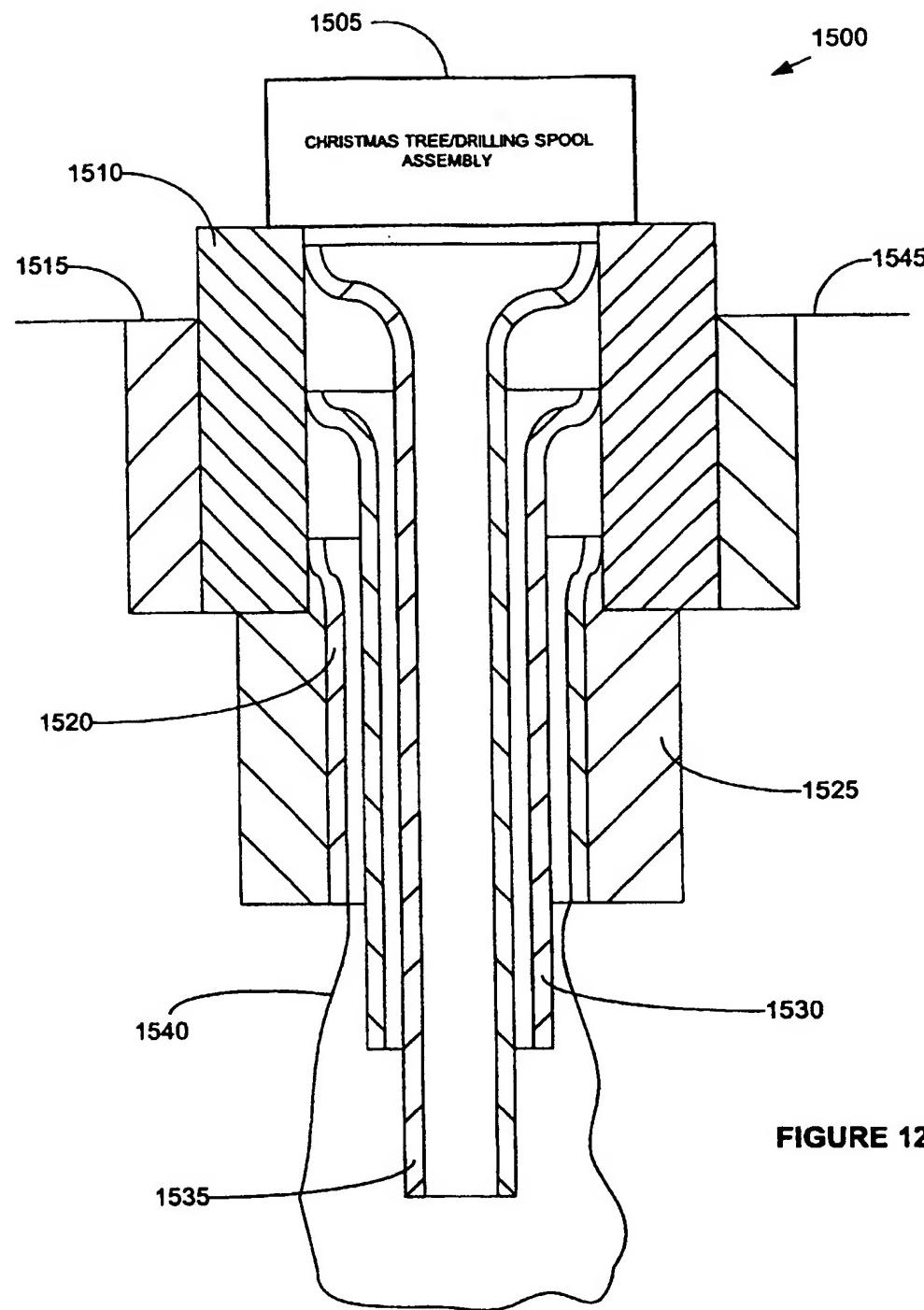
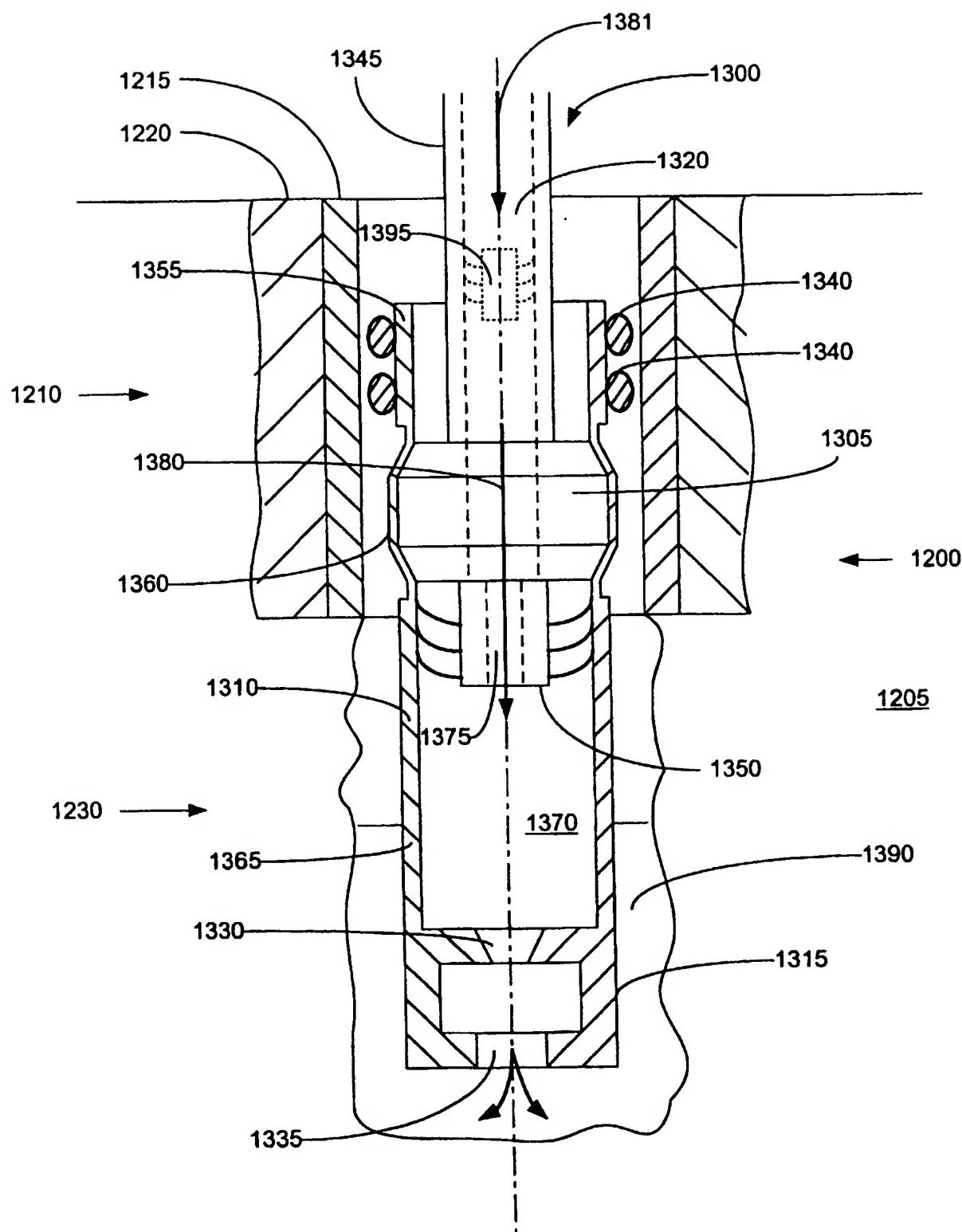


FIGURE 12

**FIGURE 11d**

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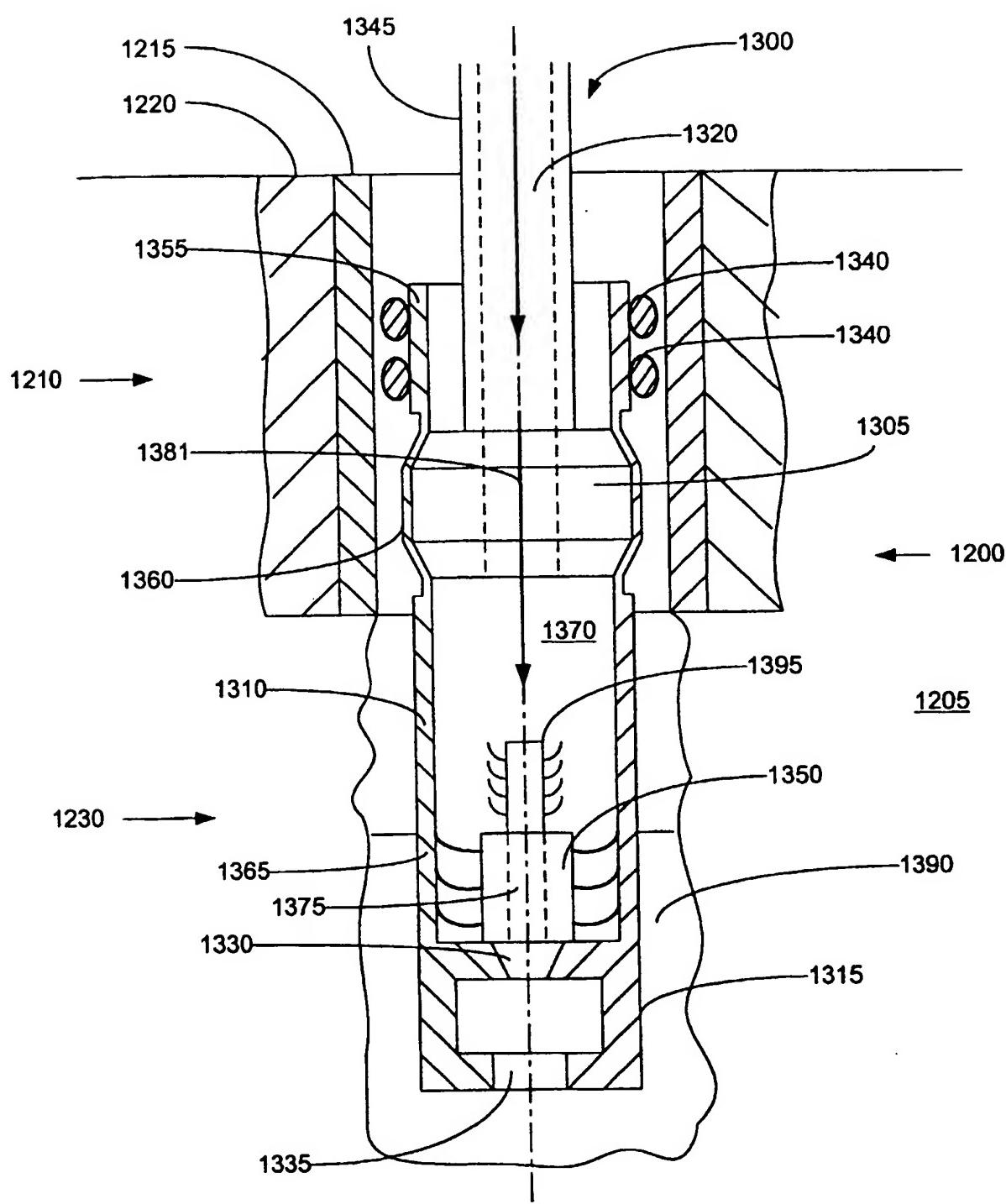


FIGURE 11e

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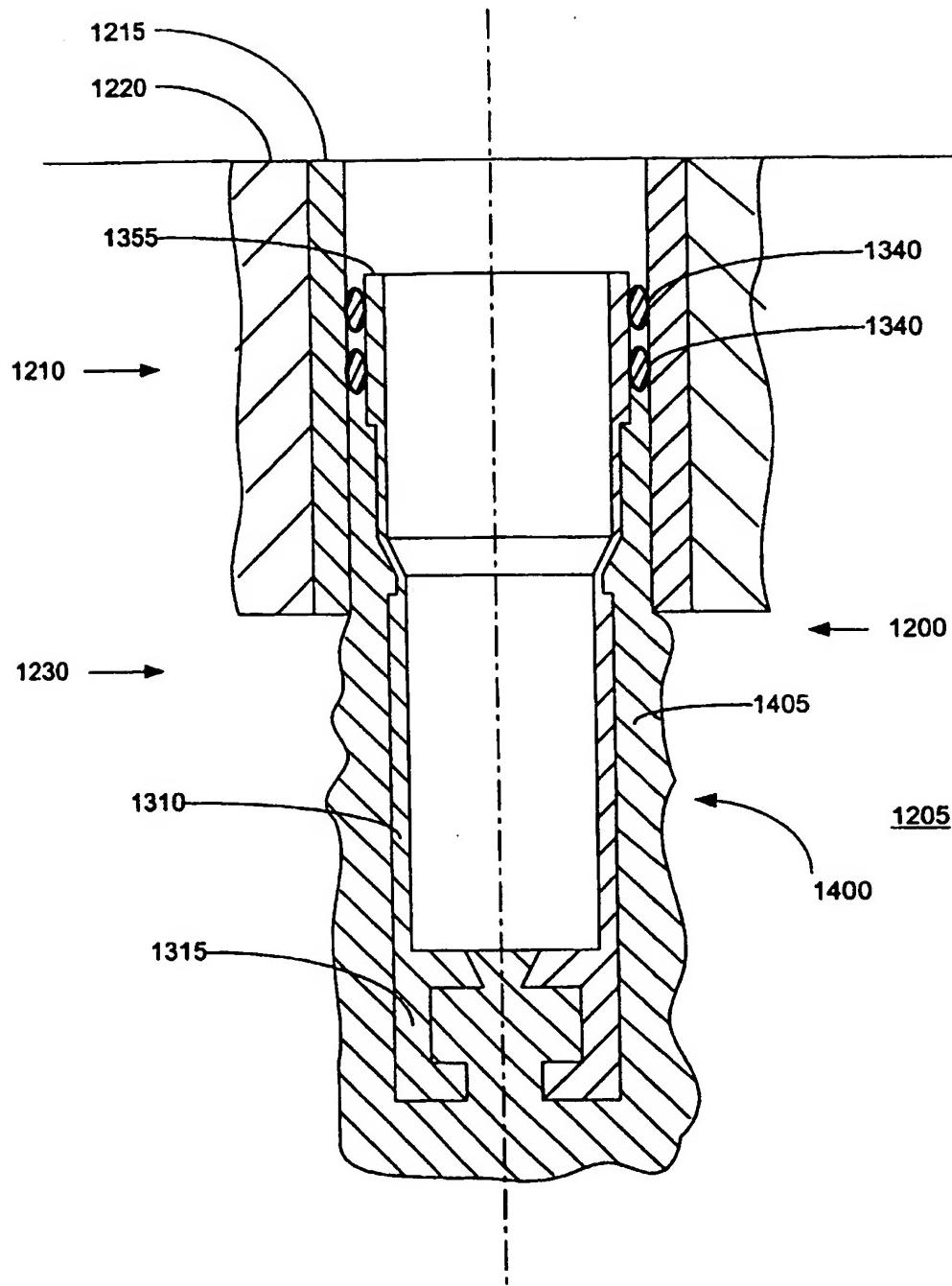


FIGURE 11f

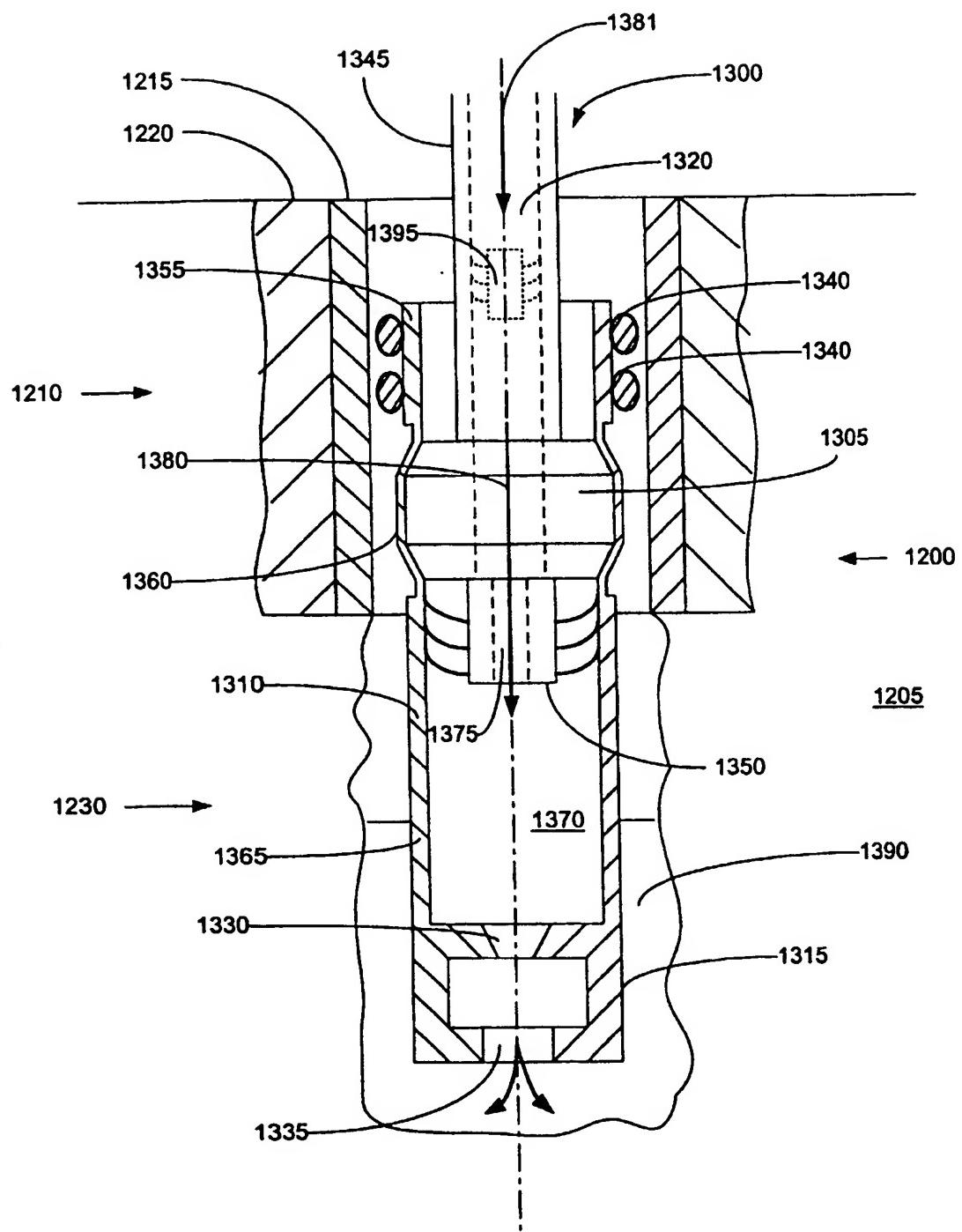


FIGURE 11d

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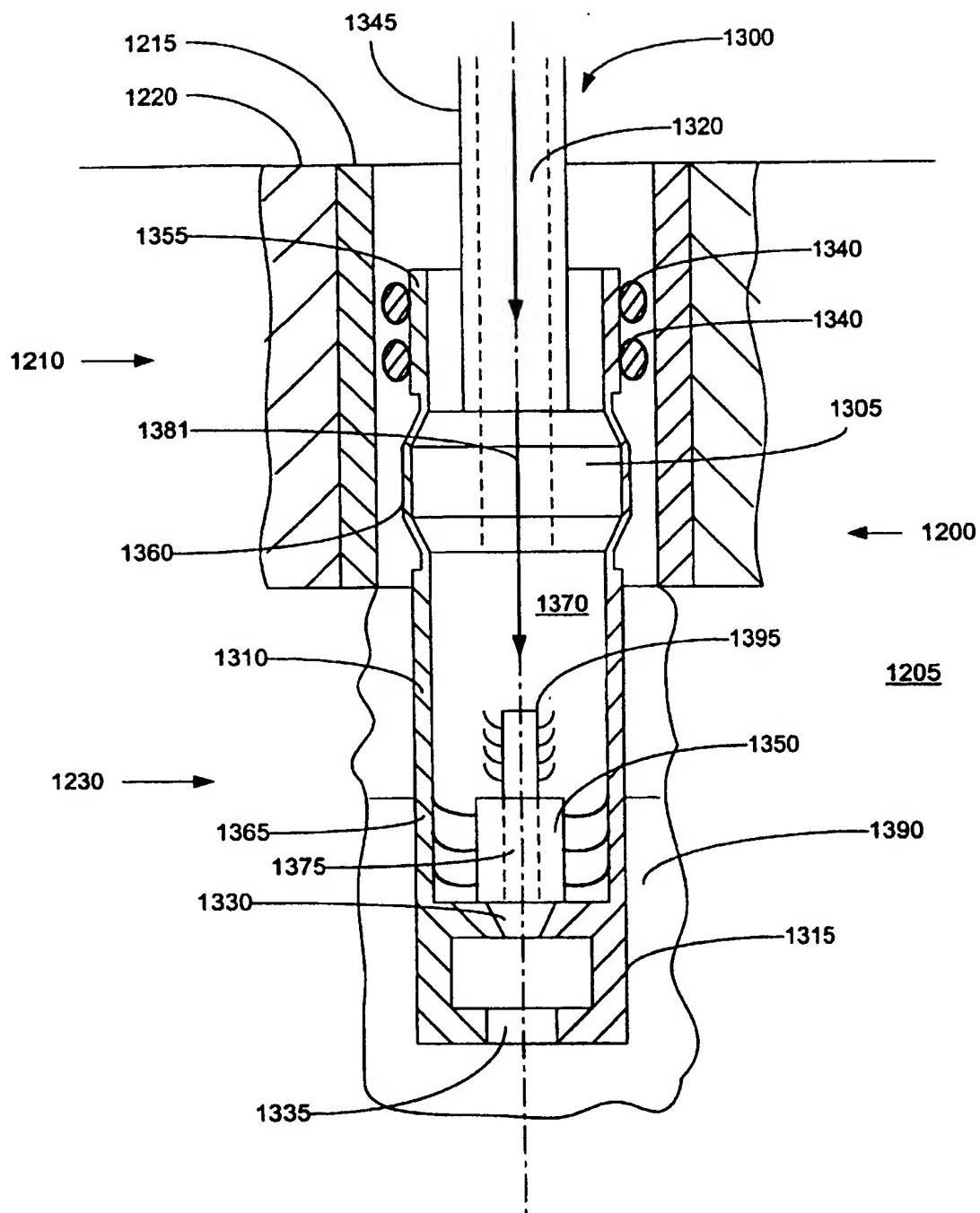


FIGURE 11e

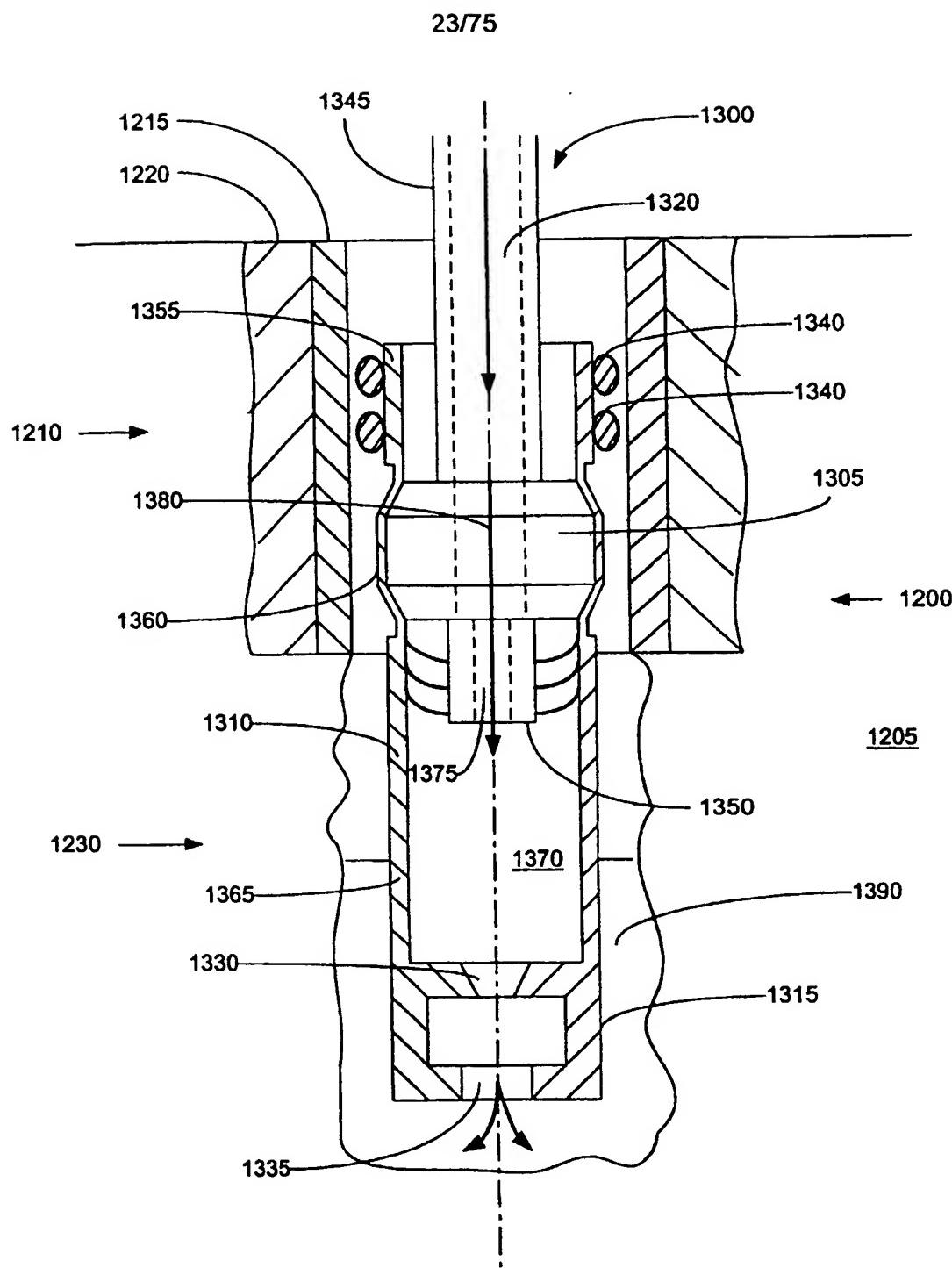
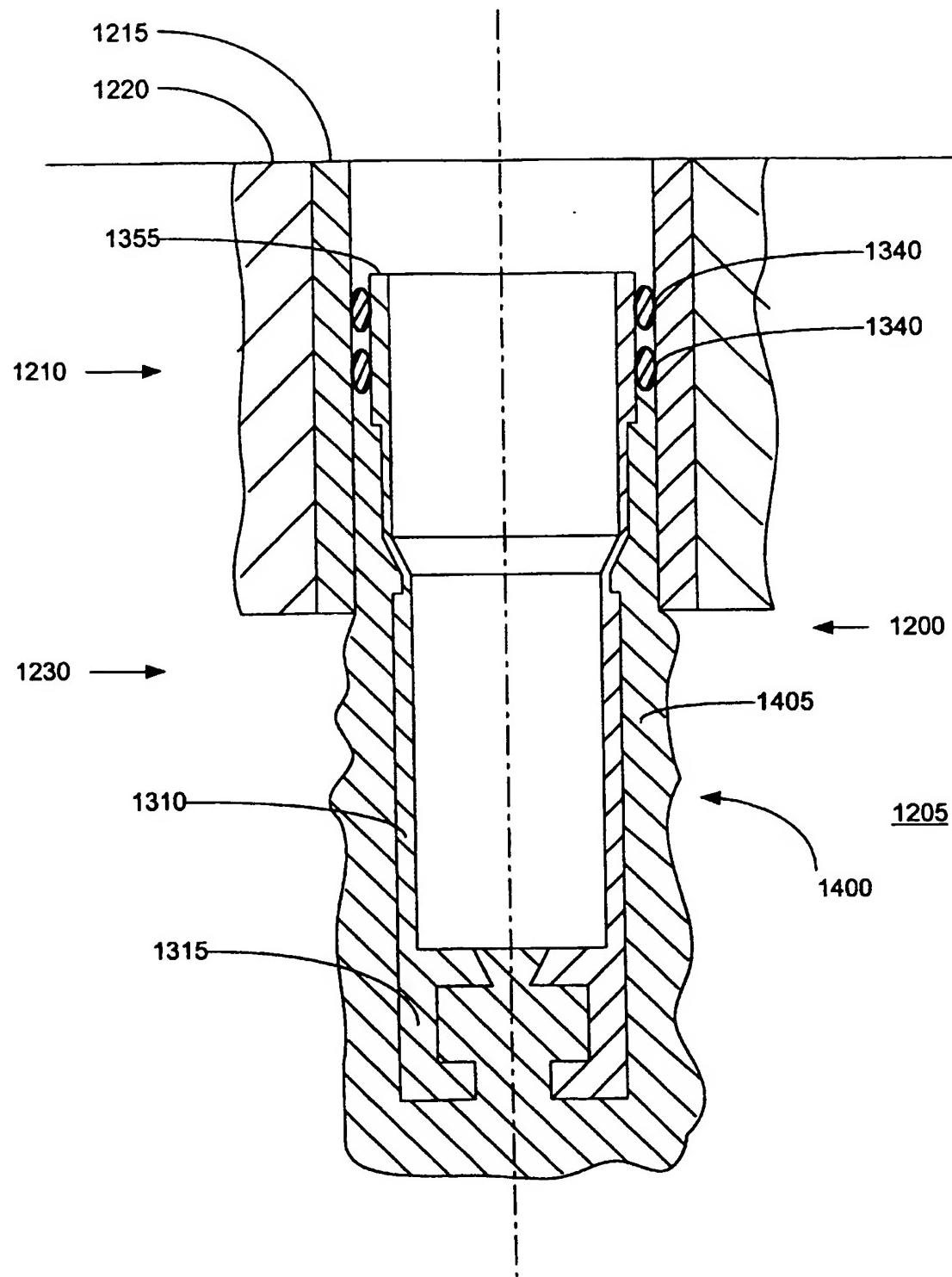


FIGURE 11c

**FIGURE 11f**

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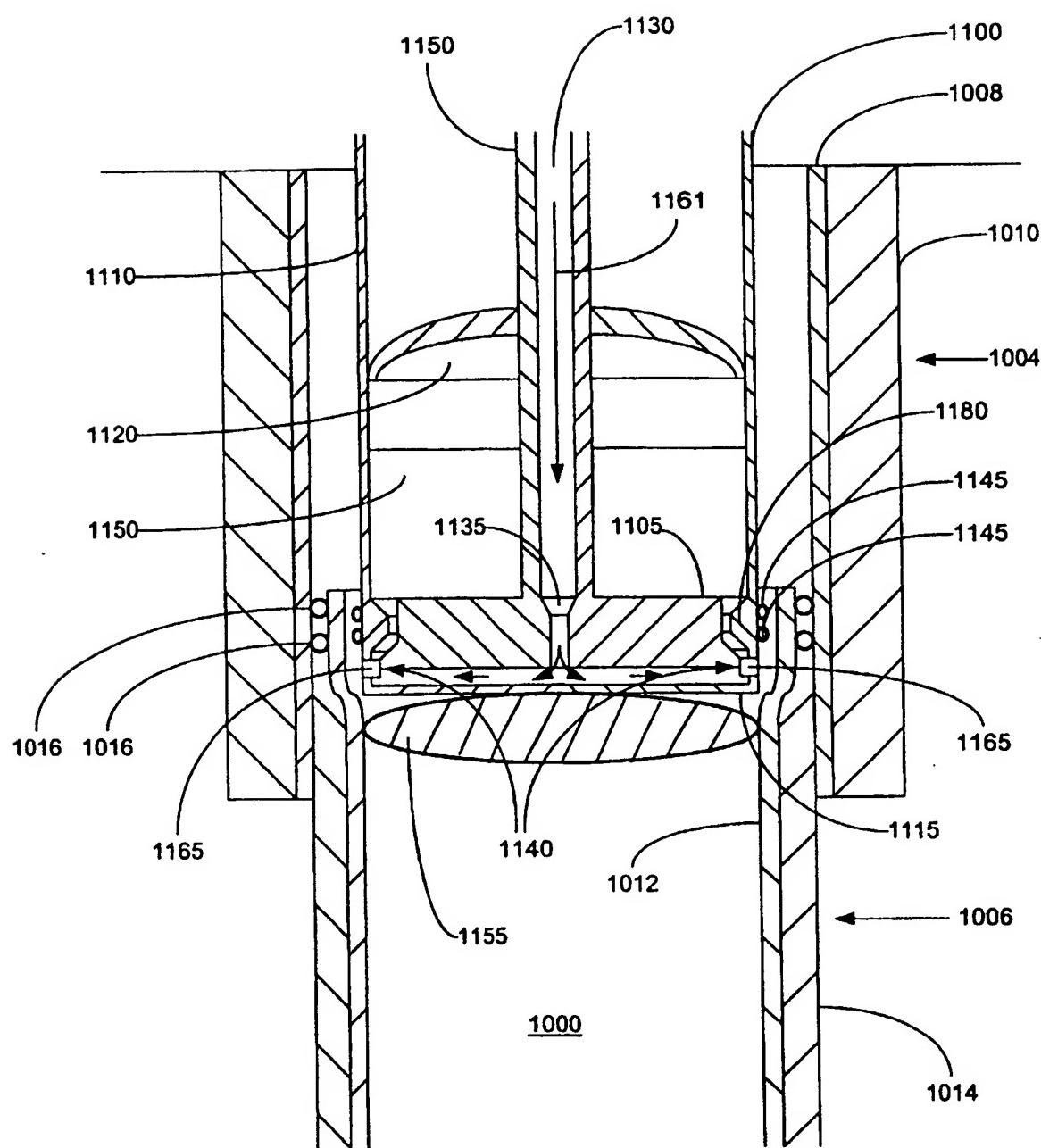
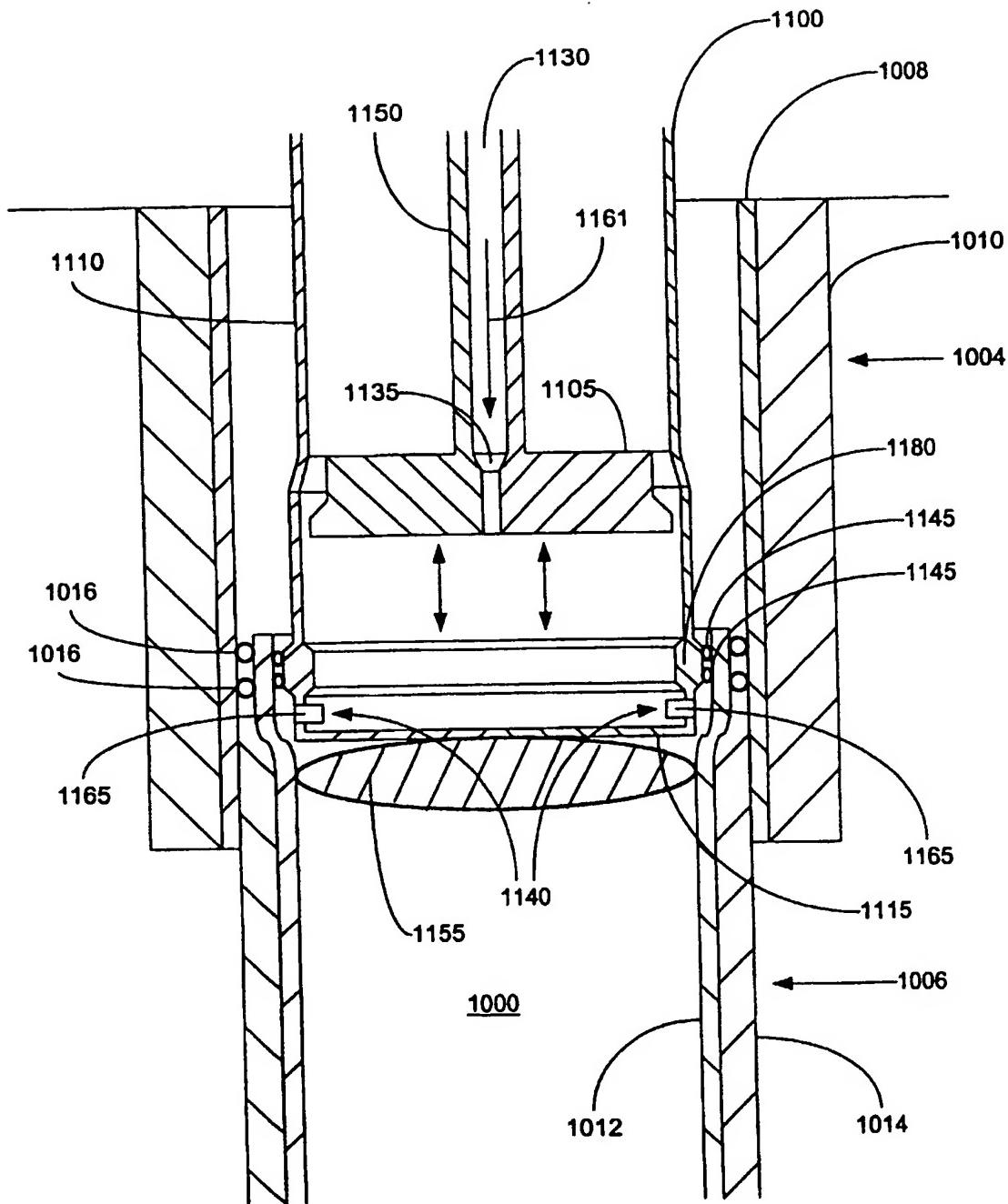
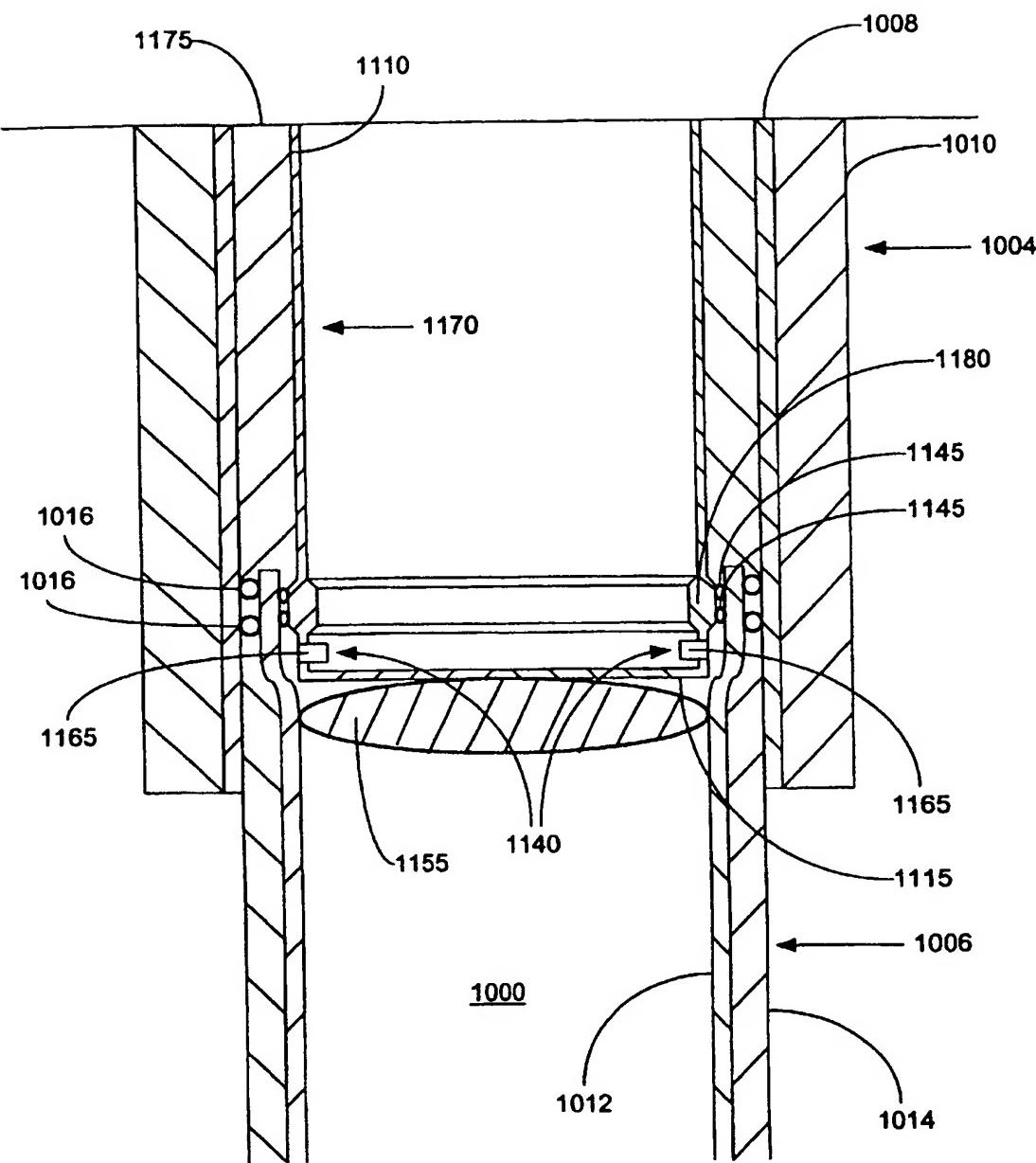
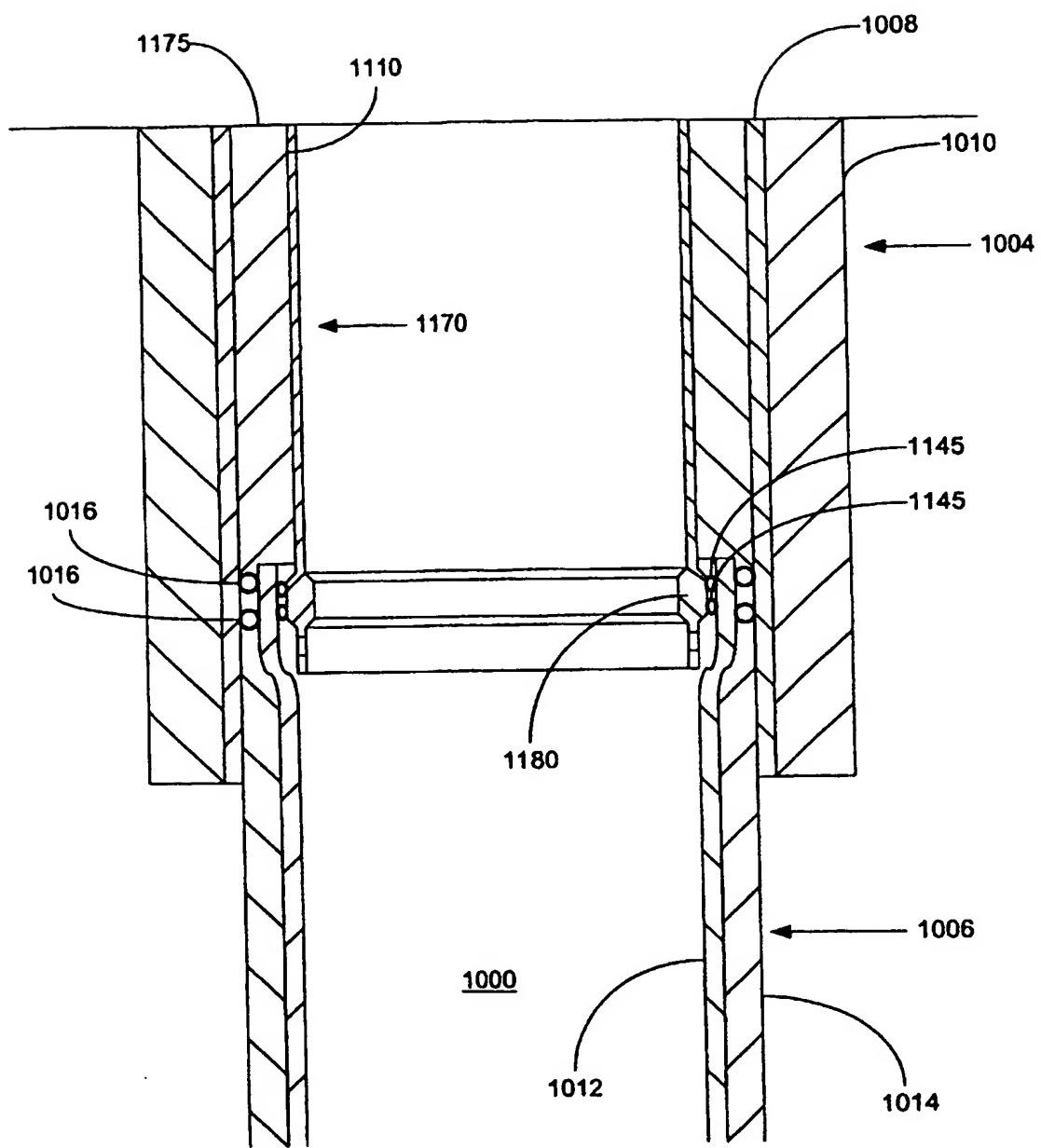


FIGURE 10d

**FIGURE 10e**

**FIGURE 10f**

**FIGURE 10g**

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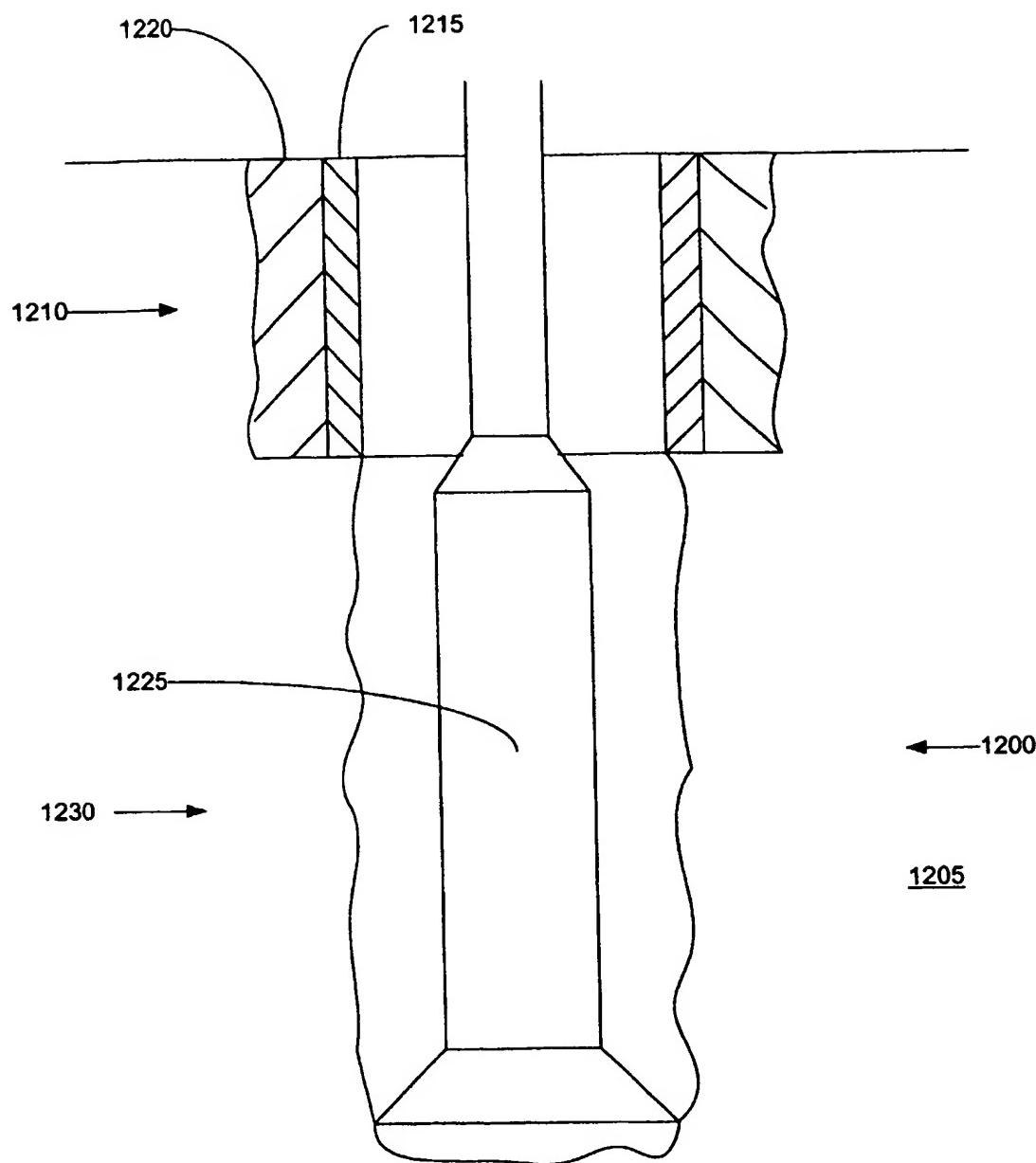


FIGURE 11a

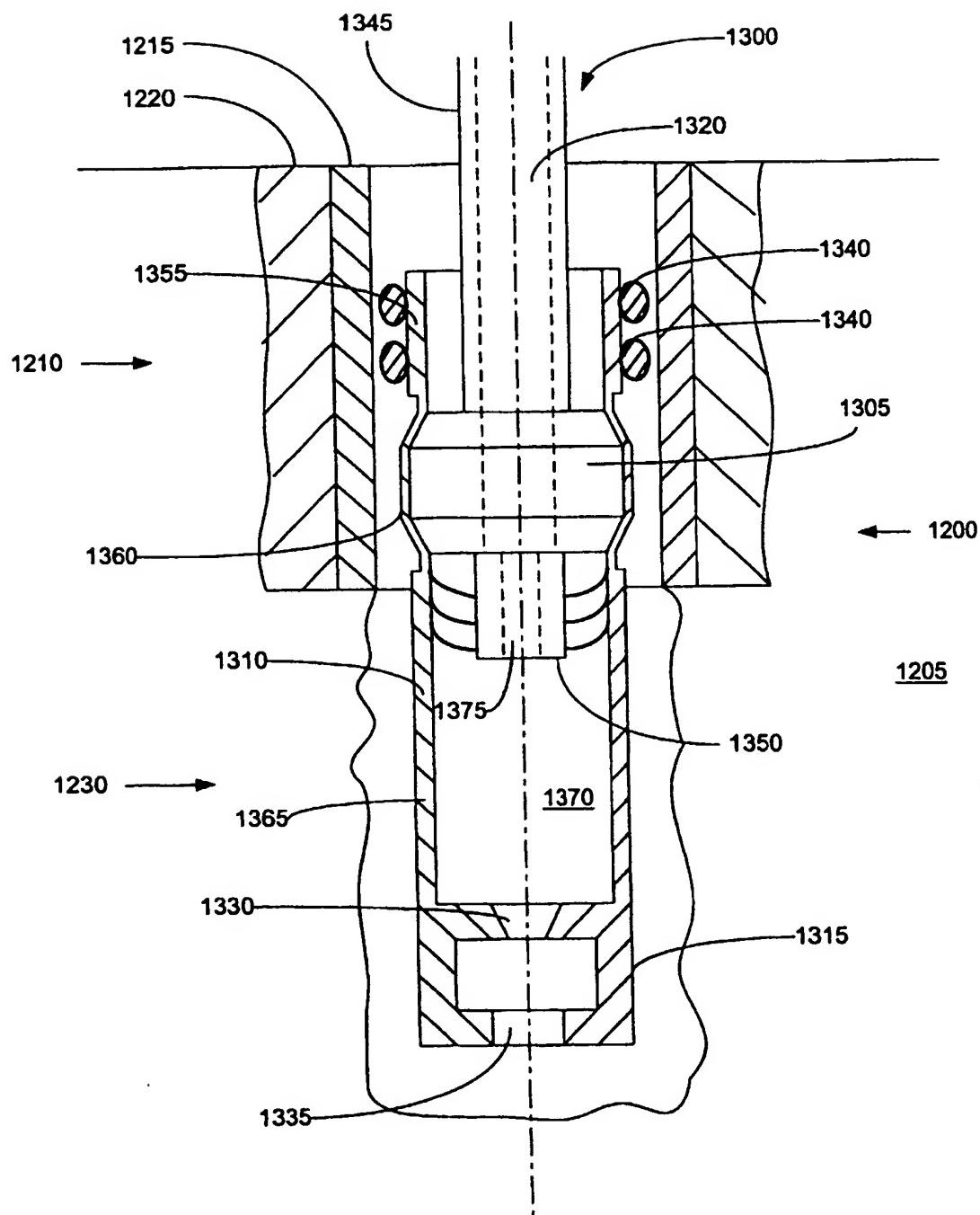
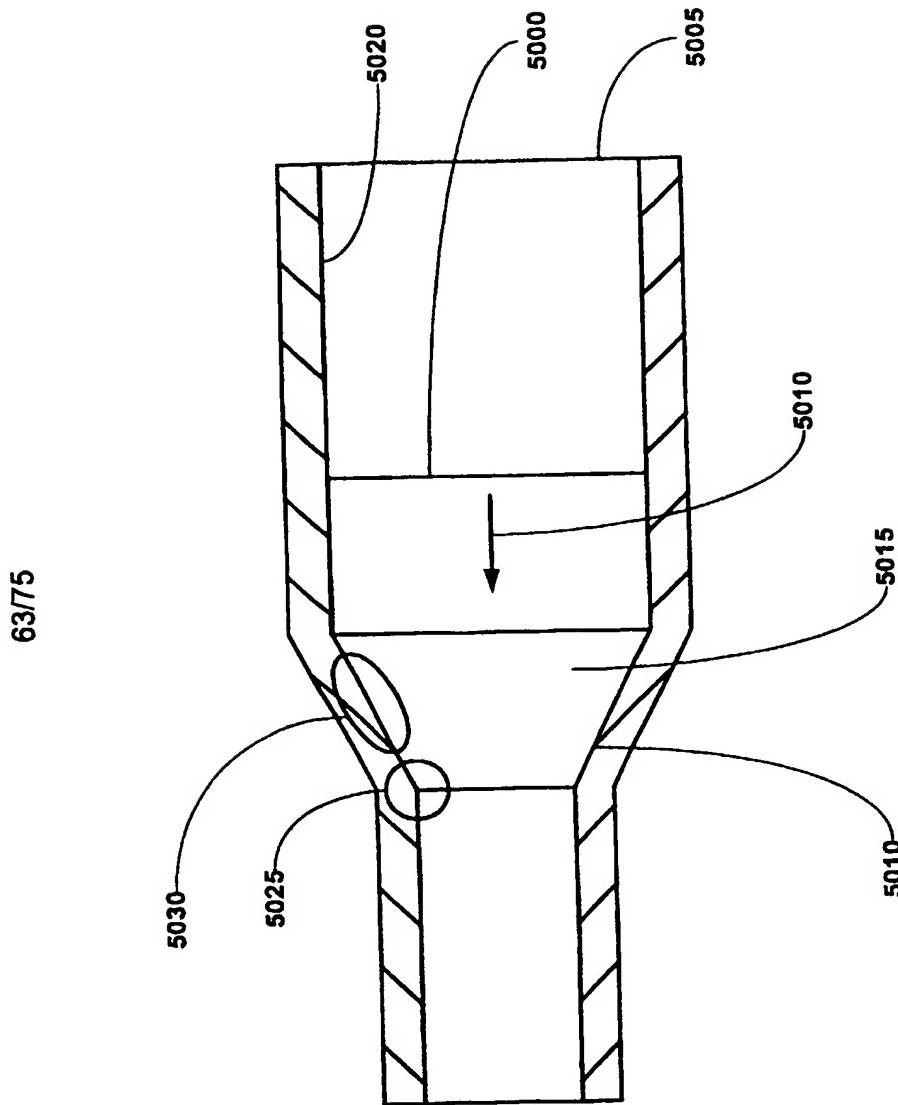


FIGURE 11b

FIGURE 31



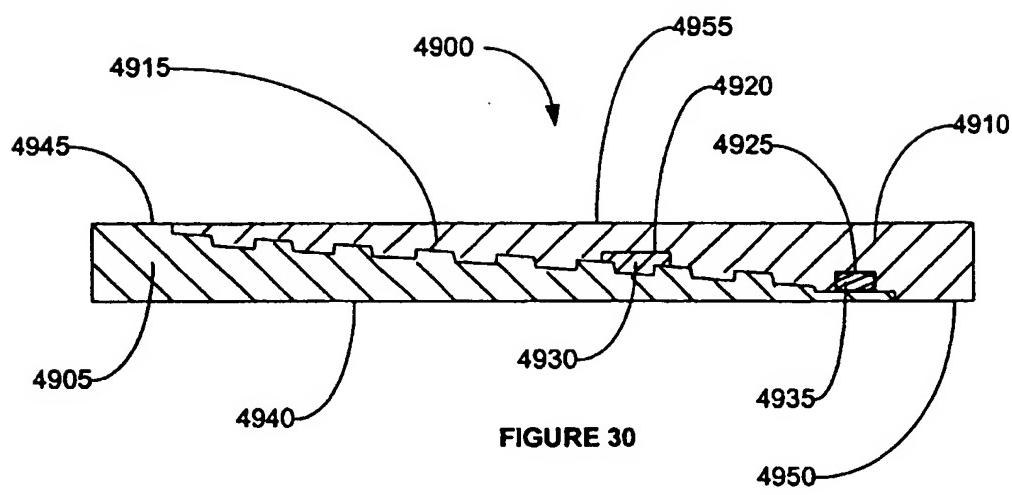


FIGURE 30